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Vol. 154, No. 26

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The Big Freeze

ONCE upon a time the earth misbehaved and tilted its axis whereupon came the ice age. It was a Big Freeze. Ordinary winters come and go ushering in succeeding periods of fertility. But this one was different.

The inhabitants of the earth, or at least that part farthest from the sun, were not prepared for perpetual winter. While they had coats made from the skins of animals to keep them warm, they could not eat them nor could they find substitutes for the corn and wheat and other crops. Nor could herds of cattle or other animals continue to exist without renewed pastures. So when the land became covered with perpetual ice and snow, the people perished because they could not exist in a frozen land.

America, like most of the rest of the world, has been living in a frozen economy. Jobs, wages and prices are frozen and the rigidity of regimentation has encased management, labor and the public alike in an icy armor in which initiative, growth and progress have been immobilized at the status quo ante.

Most of us accept the necessity for this glacial period in our economic life because we are told it is necessary in order to win the war. To win a war to make the world free. But unless we become unfrozen, we will never be free.

That is something for all of us to ponder who are looking forward to a new period of fertile growth after victory. To the time when we can freely plant our crops of ideas and efforts once more and be free to reap the harvest. To the time that we can look for and take a new job or earn and get increased wages or invent and put a new product on the market without first getting the consent of a political appointee or a government board.

We wait, we have to wait, until the sun thaws the field and softens it before we can plow. But plowing and cultivating as well as harvesting are hard work and some are tired of working. They advocate a frozen economy as a postwar world policy; the freezing of the status quo of international world trade by means of cartels.

Undoubtedly the cartel is the most effective, quick freeze for immobilizing economic progress ever invented. It eliminates competition and thereby kills the greatest stimulus to progress. It prevents new growth because it divides what is between the few who are in power in a given line of effort. It restricts employment opportunities to the whims and wishes of the mighty ones who hold the charter and who because they can write their own rules also write the verdict "the public be damned."

If you do not want to live in a perpetual Ice Age after the war or die of economic frostbite, then you should oppose at every opportunity the attempt to freeze progress in the cartel refrigerator.

John Deventer

Announcing

T I - N A M E L

New Enameling Alloy Steel . . .

. . . To Which a White Cover Coat Is Applied Direct—Assuring Superior Quality Finish, Longer Life and Lower Shop Costs

After years of intensive research and experimentation, Inland has perfected Ti-Namel, a titanium-alloy steel which eliminates the necessity of a ground coat.

Inland Ti-Namel Steel has the drawing properties of the best deep-drawing steels. It will permit drawing many parts heretofore formed and welded. It does not age-strain, regardless of time lapse between processing at the mill and fabrication by the customer. It has superior resistance to sagging, assuring enameled ware truer to required shape.

Inland Ti-Namel Steel does not reboil, therefore satisfactory enameled finishes are obtained with white or other colored cover coat enamels alone, having approximately one-half the enamel thickness

of present day enameled products. The thinner enamel finish results in less chipping hazard, greatly improving quality and increasing service-life of the ware.

Inland Ti-Namel Steel reduces enamel shop reoperations, edging and scrap. It is fired at lower temperatures, and in shorter time. It increases enamel ware output without additional shop equipment, lowers over-all manufacturing costs and assures new and better enameled products.

Pending patent applications on the new enameling process and product made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under trust agreement.

We will be pleased to send you our new bulletin on Ti-Namel and a copy of simple licensing agreement on request.

Inland Steel Co., 38 South Dearborn Street, Chicago 3, Illinois.

INLAND STEEL

December 28, 1944

NEWS FRONT

When Kaiser Industries at Fontana and Denver get into full operation on artillery shells in the next few months, their capacity will be double that of any other plant in the world, J. A. Krug told a press conference during his visit to the West Coast.

WPB will make every effort to balance the economy of the Pacific Coast between war and civilian production, he added, so that the West will not be handicapped in the postwar period by concentration on war industry while the rest of the country reconverts.

After 15 weeks of a seven-day shift installed to speed up production of attack transports, Kaiser Shipyards in the Portland area are returning to the six-day week.

Yard officials say that the Sunday work produced enough additional manhours to build five or six extra ships.

Contemplated for the postwar market is a new line of products to be introduced by the steel industry. Steel company officials are meeting to discuss a line of cold formed standard shapes formed from strip steel. Angles, channels, U's, Z's, T's, bulb angles and perhaps I beams will be included.

Scrap inventories have dropped about 13 per cent during the 11 months of the year and pig iron stocks have declined more than 17 per cent from the end of October to the close of the year. Fuel supplies are no brighter with 1944 coal production estimated to be about 6,000,000 tons short of the year's goal, 616,000,000 tons.

With the SWPC up for renewal before July, a thorough investigation of the powers given to SWPC in the disposal of surpluses is being talked about in connection with any hearings that are held on the new legislation.

To achieve closer pricing, the War Department set in motion on Dec. 20 a new program whereby prices of all prime contractors and subs now subject to renegotiation are reviewed.

By adjusting in advance any prices which are unduly high, the program is designed to eliminate excessive costs, as well as the excessive profits which are now returned to the government in renegotiation.

One-third the companies answering a questionnaire on tool tipping practice indicated that they were using high speed steel in tip rather than solid form. About half of these will continue the practice after the war, mostly for reasons of economy. Admitted weakness of the survey: Only about 10 per cent answered the questionnaire.

The total registration for mobilization of man and woman power in Britain has reached 25 millions out of a population of 46 millions.

The English campaign against unwise spending during the war is considered very successful. Total war savings are made up of \$33,000,000,000 of war loans plus \$18,500,000 of Savings Certificates plus \$70,000,000 of Post Office savings.

Words are powerful weapons, and more than 50,000,000 leaflets have been dropped over France, Belgium, and Holland since the European invasion.

The leaflet bombs are made up of cardboard cylindrical containers laced with explosive "primer cord" and detonated by a barometric fuse set to go off at a predetermined altitude. A standard 300-lb. bomb contains 80,000 leaflets.

Remanufacture of damaged tanks is a major feature of a large-scale Ordnance program. Approximately 3000 M4 General Sherman medium tanks and 550 M5 light tanks will be remanufactured before January.

New tanks, again high on the priority list, will be pushed higher on the list as reports of heavy losses from Europe continue. The more open terrain of the new battlefields, both in Europe and in the Pacific, also has resulted in greater expenditure of tanks.

One unit of the Ninth Air Force, in 323 sorties fired 1117 rockets, which destroyed 35 locomotives, 85 tanks, 15 armored cars, 164 motor transports, 19 gun positions, 9 hangars, 6 warehouses, 36 cars, 2 ships, and in addition seriously damaged 105 other targets.

Tap Grading System

Reduces Scrapped Threads

... **Predetermining the actual cutting size of a tap for a specific material prior to placing the tap on a production job has enabled the Wright Aeronautical Corp. to reduce scrap caused by torn and oversize threads to a minimum and has provided for selective fits to within 0.0003 in. Tap grading has also greatly increased tap life and has reduced lost time attributable to premature tap failure. A series of carbide thread plug gages in steps of 0.0003 in. are used for checking the thread produced in a test block.**

• • •

By C. D. SAVAGE

*Tap Grading Department,
Master Tool Crib,
Wright Aeronautical Corp.,
Paterson, N. J.*

• • •

THREADING has always been an important factor in the industrial field and is today demanding more than its original share of attention. To meet the degree of accuracy required on precision aircraft parts, the Wright Aeronautical Corp. deemed it necessary to employ a method whereby these close tolerances could be consistently met. Tap grading was the answer to this demand.

The object of tap grading is to predetermine the actual cutting size of a tap for a specific material or group of materials prior to placing the tap on a production job. It has proven itself to be a definite step in the advancement of machine shop practice. Its adoption by the Wright Aeronautical Corp. has reduced scrap caused by torn and oversize threads to a minimum and provided for selective fits to within 0.0003 in. It has assisted in the designing of proper taps for various materials and brought about a reduction in inventories. It has guaranteed a first rate inspection, thereby making possible the rejection of inferior taps before flowing into production channels. It has greatly increased tap life and reduced lost time attributable to premature tap failure.

In stud driving, tap grading is essential to produce threads within tol-

erances necessary for the assembly of studs to within specified torque limits. The specified driving torques of a stud are the same for all materials into which the stud is assembled, but since the driving torque of a stud varies with the type and hardness of material, it is necessary to provide close tolerance threads to meet these varied conditions.

Although a precision ground, high speed steel tap can be manufactured to within close tolerances, it is no guarantee of the size thread it will cut. If a close tolerance thread is desired, it is therefore necessary to predetermine the size thread a tap will cut, and select the tap that will cut within the specified range.

No method of cutting tool application lends itself more to variation than that of tapping. The quality and tolerance of a thread depends upon various factors, the most important being the material to be tapped. Because of the various characteristics of the material to be tapped, a tap must be designed to suit the job. Tap specifications should be specific so as to entail all of the features necessary for the tap to effectively produce a desired thread. These features should be rigidly adhered to as the slightest change from the original design may tend to change the cutting action of

the tap resulting in torn and oversize threads.

A discussion involving the most effective hook and rake angles, chamfers and reliefs on taps for specific materials will not be entered into at this time, but it must be borne in mind that every material demands a particular design of tap if quality and quantity are anticipated.

In order to determine the feasibility of grading taps extensive tests were run. These tests proved successful and resulted in the establishment of a tap grading department which is equipped with facilities to inspect, grade and resharpen all taps used in the plant.

General Procedures

On entering the plant new taps are received in the tap grading department and are subject to the following procedures:

1. Inspecting.
2. Grading and marking.
3. Shipment to master crib.

All new tap lots are assigned a tap size record card upon receipt. This card bears the tool number, purchase order number, tap size and quantity. It shows the material specification and reamer size for the test holes and space is also provided for the grader to record the quantity of taps that fall within the various classifications. The tap size record card accompanies the taps through the necessary channels, insuring their proper disposition until grading is complete, when the card is filed for reference.

After the tap size record card is filled out, the drill press operators are notified as to the quantity of test blocks required, their Aeronautical Material Specification and hardness, and the drill, reamer and counterbore specifications. They then proceed to prepare the test blocks for the tapper.

The test blocks are of various materials measuring 12 x 4 x 1 in., each specification corresponding to the same composition and physical properties as that used on production

jobs. As soon as the test blocks are received in the department, the AMS number is stamped on the side. They are next checked for hardness and if found to be within the specified range, are marked accordingly. The blocks are drilled, counterbored to permit a specific wall thickness, countersunk, reamed to produce a required percentage of thread and marked according to their reamed size to avoid confusion with other blocks.

The taps are first subjected to a visual examination by the tool inspector to insure adherence to blueprint specification. The section allotted for tap inspection is equipped to provide an adequate, thorough inspection. Having obtained the approval of the tool inspector, the taps are then ready for the second step, that of tapping the test blocks.

Machine tapping was decided upon after investigation proved that it was not practical to grade taps by hand. A vertical tapping machine incorporating a lead screw attachment is used and has proved satisfactory. Although the lead screw does not insure a perfect thread, it eliminates variations that would otherwise be prevalent, were hand feed used. Comparative spindle speeds are maintained and the same cutting oil is used as on the production job.

Three holes are threaded with each tap, after which the operator places the tap, shank down, in drilled holes provided in a suitable wood carrier block. The taps are placed so that they correspond to the threaded holes in the test block in order that the grader can identify the respective tap for each set of threaded holes. In the majority of cases, tapping three holes is sufficient to remove burrs (feather edge) from the tap, and page readings are taken of the third hole tapped.

The wood carriers containing the taps and the test blocks then go to the grader who first gives the threaded holes a visual examination. If torn threads are discerned the offending tap is removed from the carrier and the condition noted on the tap size record card. The threads are next checked for size. Plug thread gages, the pitch diameter of which advances from basic to a specific high limit in steps of 0.0003 in., are used to determine the size of the thread. Due to their excessive usage and close tolerance, these gages are made from a wear resistant grade of tungsten carbide and are inspected daily to insure accurate size. Care is



TAPS are mounted in a wooden block corresponding with the tapped test plate. Each hole is checked with solid carbide gages varying by 0.0003 in. on the p.d. Taps are electric-etched to correspond with the actual size of the hole cut.

taken to clean the threaded test blocks and gages thoroughly to facilitate and insure accurate grading.

Grade Specification

In grading the test blocks, the corresponding gage size for the third hole tapped is noted. The respective tap is then drawn from the wood carrier and the grade specification etched on the shank parallel to its axis. Two symbols or specifications, such as "A1-9," are employed. The first symbol, "A1," alludes to the material or material group for which the tap has been graded. The second symbol designates the size in "tenths" the tap is cutting above the basic pitch diameter. The figure 9, for example, indicates the tap to be cutting 0.0009 in. over basic pitch diameter.

The material specification symbol refers to a group of materials in which the graded tap will cut the given amount over basic pitch diameter. The "A1" in this case refers to a group of cast aluminum alloys. Materials of similar composition and whose physical properties are closely related are grouped, if, in tapping, the same size thread is obtained. When materials can be grouped, a group symbol is used advantageously since it eliminates the necessity of etching individual material specification num-

bers on the tap and increases the availability of the tap.

These material group classifications cannot be rigidly adhered to in all cases due to variations encountered in material composition, hardenability and in the type of hole being tapped. Where variations occur, the individual AMS number is used.

After grading is complete, the quantity of taps falling into the various classifications are entered in an appropriate place on the tap size record card. All remarks are entered so that taps responsible for torn, oversize or undersize threads may be subjected to a thorough inspection to determine cause of failure. The taps are then replaced in their respective containers according to grade specification and sent to the master tool crib.

All graded taps bear tool numbers to limit their use to specific jobs for which they are adaptable.

Resharpening and Servicing

The tool distribution cribs return all dull, broken and wornout taps at scheduled intervals to the tap grading department where disposition of them is made. These are first given a visual inspection to determine the advisability of resharpening and returning them for further use on pro-

duction jobs. Broken and wornout taps not fit for production are scrapped. Those suitable for resharpening are grouped according to their grade specifications and released by the inspector for grinding.

The resharpening of dull taps is of utmost importance and special care is exercised to insure the exacting tolerances for which the tap was originally graded. They are resharpened in lots according to blueprint and grade specifications which tend to reduce setups and insure a more accurate grind. In the majority of cases the original design is maintained, unless excessive wear requires a variation.

After grinding, the taps are regraded to insure their adaptability to the job for which they were originally graded; if found satisfactory, they are returned to the distribution crib from whence they came. If, upon regrading, any taps are found to check outside of their original grade specification, they are held aside, inspected to determine cause and corrected before leaving the department.

The data in Table I tend to illustrate the tolerances that have been held on screw threads by the application of graded taps. The figures are results of applying graded taps to actual production jobs in the plant.

Tap Life

When a correctly designed tap is graded and applied to a ferrous metal job, the pitch diameter will generally wear at a constant rate, decreasing

in size until it finally falls below the basic pitch diameter. In some cases, however, it will wear down gradually to a certain point and then tend to cut a larger thread prior to breaking down completely. This can result from the tap loading or its cutting edges breaking down and is an indication that the tap is dull.

The tap life records cited below are examples of this condition. The taps were applied to a steel crankcase job and permitted to run till they dulled, the thread size being checked periodically to determine the decline.

Tap No. 1—Classification 5

Hole No.	P. D.
1	0.4056
100	0.4056
750	0.4056
800	0.4053
1100	0.4053
1400	0.4053
1401	0.4056
1600	0.4056
1680	0.4053
1690	Tap dull

Tap No. 2—Classification 8

Hole No.	P. D.
1	0.4059
100	0.4059
740	0.4059
750	0.4056
1100	0.4056
1400	0.4056
1488	0.4053
1600	0.4053
1740	0.4053
1741	Tap dull

Two 0.438-20 taps referred to in Table I under item No. 2 were permitted to run on the Greenlee head

machine and were checked periodically to determine thread decline. A fine finish thread was obtained and the pitch diameter gradually decreased until the basic gage fit snugly. The wear history was as follows:

Tap No. 6—Classification 9

Hole No.	P. D.
1	0.4059
600	0.4059
650	0.4056
1000	0.4056
1600	0.4056
2400	0.4056
2700	0.4053
2800	0.4053
3000	0.4050
3200	0.4050
3400	Tap dull

Tap No. 7—Classification 12

Hole No.	P. D.
1	0.4061
100	0.4062
300	0.4062
400	0.4059
1800	0.4059
2800	0.4059
3000	0.4056
3100	0.4056
3300	0.4053
3400	0.4050
3430	Tap dull

The above figures tend to show the increases that can be obtained in tool life and the time saved by applying a graded tap with the pitch diameter on the high limit.

The two aforementioned 0.438-20 taps that were applied to the steel crankcase job showed improvement as follows:

Average ungraded tap life: 1 to 3 cases, or 540 holes.

Graded tap life: 9 to 10 cases, or 1700 holes.

Results obtained from the application of graded taps on cast aluminum cylinder heads (AMS 4220) are as listed in Table II.

The figures set forth to illustrate the increases in tap life are representative of production jobs that require the maximum in tool quality.

Constant Check Maintained

As was previously stated, the success of tap grading is subject to a number of variations which must be taken into consideration if good results are to be obtained. To insure the maximum in quality and tool life, investigators are assigned to all jobs presenting difficulties. It is their duty to correct trouble due to tapping and recommend a suitable tap for the job.

Prior to the application of a graded tap on a production job the investigator must ascertain the following:

- Machine tool and fixture alignment.

TABLE I
Comparison of Graded Tap Size and Actual Thread Size Cut in Production

Tap	Basic P. D.	*Grade Spec.	Actual Thread Size	Tol. Held
No. 1 Steel Crankcase Cylinder Pads (AMS 6382)				
0.438-20	0.4050	5 (0.4055)	0.4056	+ 0.0001
0.438-20	0.4050	8 (0.4058)	0.4059	+ 0.0001
No. 2 Cast Aluminum Cylinder Heads (AMS 4220)				
0.438-20	0.4050	9 (0.4059)	0.4059	± 0
0.438-20	0.4050	12 (0.4062)	0.4061	± 0.0001
0.375-16	0.3344	9 (0.3353)	0.3353	± 0
0.375-16	0.3344	9 (0.3353)	0.3353	± 0
0.313-18	0.2764	9 (0.2773)	0.2773	± 0
No. 3 Gears of AMS 6250—Rockwell 32-40 C				
0.250-28	0.2268	9 (0.2277)	0.2279	+ 0.0002

* The grade specification number is that which was applied to the tap in grading or the thread size the tap cut in the test block. The actual thread size is that which the graded tap cut on the production job.

TABLE II

Size Tap	Grade Classification	Average Ungraded Tap Life	*Average Graded Tap Life
1 in.-14	9	50-200	4000
0.438-20	10	200-500	6000
0.375-16	9	200-500	5500
0.313-18	9	200-500	5500

* Figures represent increase in tap life per regrind.

2. Rigidity of tap holder and spindle.

3. Proper lubricant.

4. Maximum speed.

All these conditions must be considered since spindle play, loose fixtures, torn lead screws, or misalign-

ment will result in torn or oversize threads. The last two factors are, of course, governed by the material to be threaded.

To insure the taps against rough handling they are released from the tap grading department in cases or

small cardboard tubes. These tubes fit snugly over the threaded section of the tap, are easily removable and insure the taps against damage. Due consideration must be given to the fact that a tap is a multiple point cutting tool and it is essential to protect it from knocks and bangs if tool quality is to be maintained.

The benefits obtained through the use of graded taps have been of economic advantage. The importance of its continuance in this field, therefore, cannot be overemphasized. Tap grading is by no means a cure-all for the many problems involved in tapping but is definitely a step in that direction.

Plastic Dip Coating by Conveyor

AT the Corcoran Brown Lamp Works, Division of Electric Auto-Lite, Cincinnati, a conveyorized unit is being used to coat spark plugs with ethyl cellulose to form a tough, water-proof, corrosive resistant coating. When the need for protection has passed, the coating is easily removed by slitting and stripping it from the part.

The machine shown in the illustration was made by the Youngstown Miller Co., Sandusky, Ohio, and is capable of dipping spark plugs at the

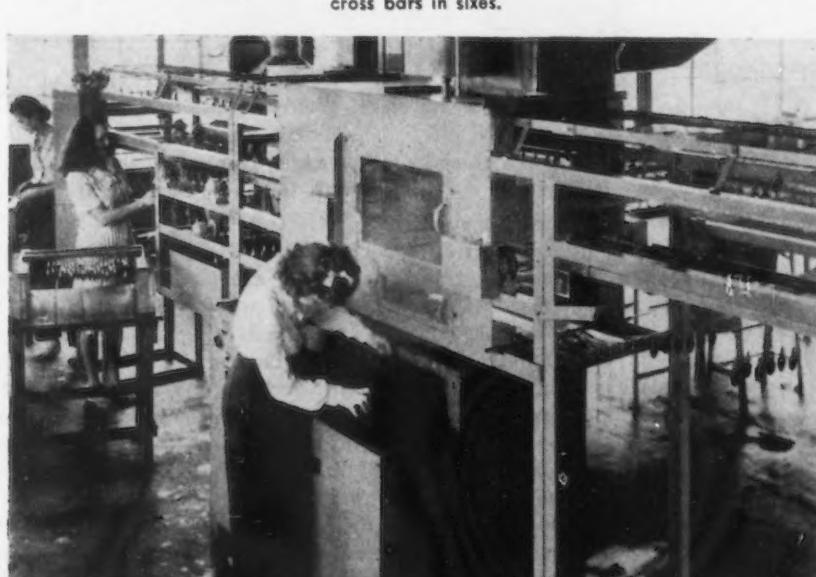
rate of 4500 per hour. Indirect heat enables the melting of 100 lb. of plastic per hour without danger of breaking down the ethyl cellulose. Thermo-static control is maintained over both the heat exchange medium and the plastic to insure that neither rises over its maximum allowable temperature. Extremely close control (2 deg. F. maximum variation) of temperature is achieved with low heating surface temperature.

The solid plastic is introduced at the loading end of the tank and re-

duced to liquid at the right hand end of the heating pads. The temperature of the liquid is raised to the dipping temperature by flowing over and between the pads to the left hand end of the unit where it is picked up by a plastic pump immersed in the liquefied plastic. The pump delivers the plastic into the dipping compartment at such a rate as will maintain an overflow over a weir located at the right hand end of the dipping tank. The overflow is reheated and returned to the pump. This plastic movement gives several needed effects:

- (1) The film which forms on the dip tank surface exposed to the air is continually removed or prevented from forming because the surface is in steady motion in the direction of the weir.
- (2) Bubbles which may form in the ethyl cellulose due to the immersion of the part to be dipped are continuously removed over the weir.
- (3) The temperature of the plastic at the point of dipping is maintained uniform, resulting in a standard quality of coating at all times.
- (4) The level of the dipping surface is maintained without variation. The weir is adjustable so that the level of the dipping solution may be controlled for various sized parts.
- (5) Agitation.

An overhead return permits a travel time to allow the plugs to cool before packing and requires a minimum of labor since the persons packing can also remove the coated parts.



How to Bend

Aluminum Tubes and Shapes



THE most important factors on which the bending of aluminum and aluminum-alloy tubing depends, are the mechanical properties of the tubing itself. When a tube is bent, the material on the outside of the bend is, of course, stretched and that on the inside is compressed. Ductility is therefore an important property of the metal that is to be bent since it must be ductile enough to permit both stretching and compression. Elongation alone is only a partial index of ductility and, in order to appraise ductility, it is necessary to consider the ratio of yield strength to tensile strength. In general, a combination of high elongation and low ratio of yield strength to tensile strength is the most satisfactory index to ductility.

In addition to the ductility of the material, the size and shape of the tubing are factors that govern the bending of a tube. The sharpness of a bend depends not only upon the diameter of the tubing but also upon the ratio of wall thickness to diameter. Tubes of ordinary wall thickness in relation to their diameter can be bent to a radius twice their outside diameter. Bends of even smaller radii can be made under certain conditions, while some of the harder alloys may

A "HICKEY" tee is often used to bend aluminum pipe and conduit. Careful checking against a full-size-layout or template will result in satisfactory bends.

require radii greater than five times their diameter to bend cold.

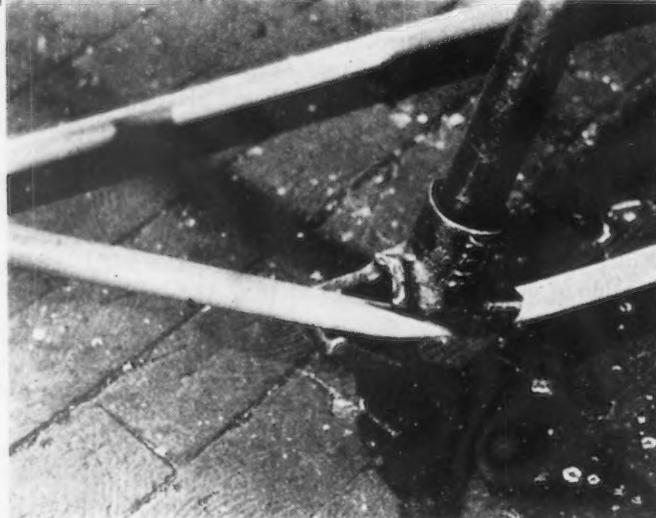
A tube with an extremely heavy wall will have bending properties somewhat comparable to those of wire or round rod, but it has more of a tendency to rupture on the outside of the bend than rod and requires a larger bending radius when the outside diameters are the same. The thinner the tubing the more tendency there is for rupture on the outside of the bend because the stretching thins out the wall to a point where it will fail more easily. Extremely thin-walled tubing has a tendency for

FOR limited production, aluminum tubing may be filled with a low-melting-point alloy to provide inside support during the bending operation.

failure to occur by buckling on the inside of the bend.

Besides fracturing and buckling, another difficulty that must be overcome in tube bending is the tendency of the tube to flatten or distort so as to reduce the size of the opening at the bend.

There are four aluminum alloys, 2S, 52S, 24S, and 61S, which are used to make various shapes of commercial tubing. These four alloys are divided into two classes: The first two mentioned are the non-heat-treatable alloys in which the harder tempers are produced by work hardening; the latter two are heat-treatable



alloys which respond to thermal treatment to improve mechanical properties.

The temper designations for aluminum alloys are as follows: "O" indicates dead-soft or annealed; "H" is the full-hard temper of non-heat-treatable alloys obtained as the result of cold working; " $\frac{1}{4}H$," " $\frac{1}{2}H$," and " $\frac{3}{4}H$ " are intermediate degrees of hardness obtained by cold working; "T" indicates the fully heat-treated temper of heat-treatable alloys; "W" is an intermediate room temperature aged temper of certain alloys before elevated temperature age hardening.

takes place; and "RT" signifies the temper resulting from additional cold working after heat treatment.

Alloy 2S-O will withstand greater bends than any other tubing alloy, but its workability decreases as the temper increases and the full hard temper will take only slight bending. Alloy 52S-O has comparable bending characteristics to 2S-O, but it has double the tensile strength. Alloys 24S-O and 61S-O are nearly equal as to the ease with which they may be bent, but the former requires greater bend radii than the latter when both are in the "T" temper. If, however, the bend is made immediately following quenching, after heat treatment, 24S can be bent over smaller radii than 61S-T. The following is a list of alloys and tempers having comparable bending characteristics:

2S-O is comparable to 52S-O
2S-1/2H is comparable to 24S-O and 61S-O
2S-H is comparable to 61S-T
24S-O is comparable to 61S-O
61S-W is comparable to between 2S-1/2H and 2S-H

The sharpness of the bend and the degree to which the tube can be bent

for bending. Though crude, this method will result in satisfactory work if the bends are carefully checked against a full size lay-out or template. Bending jigs or tools, however, will produce bends less distorted and may be necessary for difficult bends or for large quantity work.

Another simple method for bending larger tubes, if the bend is not severe, is to place the tubing between two smooth pegs which are properly spaced on a ship's table or bench. The operator pulls steadily on the free end of the tube to make the bend. It is necessary to make the bend a little at a time, moving the tube as the bend progresses, and never applying stress to the part already bent or it may buckle. The accuracy and uniformity of the shape of the bend made by this method will depend largely upon the skill of the operator.

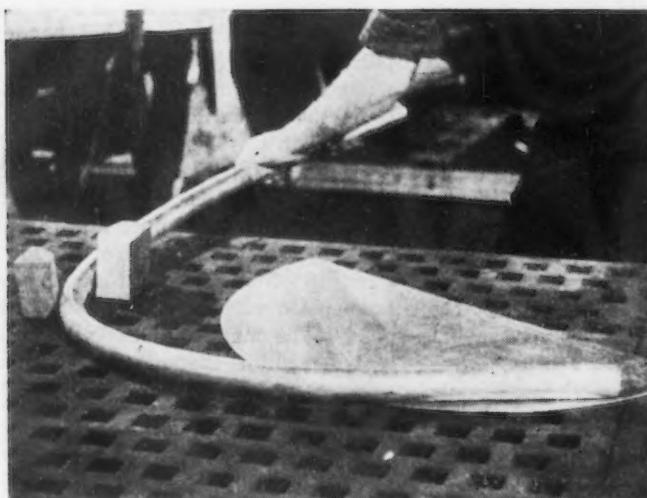
Greater accuracy and uniformity can be obtained if a bending form is used. The tube is placed across two pegs or grooved rollers, the form is shoved against the tubing, and the tubing is then forced around the form

by the pegs. Difficult bends cannot be made by this method because the pegs tend to retard the flow of the metal on the outside of the bend, increasing the tendency to rupture.

A modification of the bending methods previously described is the replacement of one of the pegs by a bending form around which the tubing is wrapped. A shoe or bearing block is provided for the other peg to distribute the load. This method is better than the two-peg method since it provides a bending form to which the tubing can be bent accurately and there is less likelihood of the tube collapsing on the inside of the bend. It is also an improvement over the two-peg bending-form method in that there is less restraint against flow of the metal on the outside of the bend, thus reducing the tendency for rupture from stretching of the metal. By using a cylinder of the desired diameter and length for the bending form, this method has been found satisfactory for making helical coils.

For limited production of more difficult bends, such as small bend radii in thin-wall tubing, provision must be made to prevent distortion of the tube, and this is generally accomplished by the use of a filler in the tube. Sand is sometimes employed and then shaken out when the bend is completed. Rosin, pitch, or tar may also be used, poured in the tube in a molten state and allowed to solidify before bending. These fillers provide fairly good support, but a cleaning problem is encountered since the filling material must be removed afterward.

Low-melting-point metal fillers may also be used for bending thin-wall tubing. Wood's metal, an alloy of bismuth, lead, tin, and cadmium is often used. It melts at 160 deg. F. and is easily removed by melting in



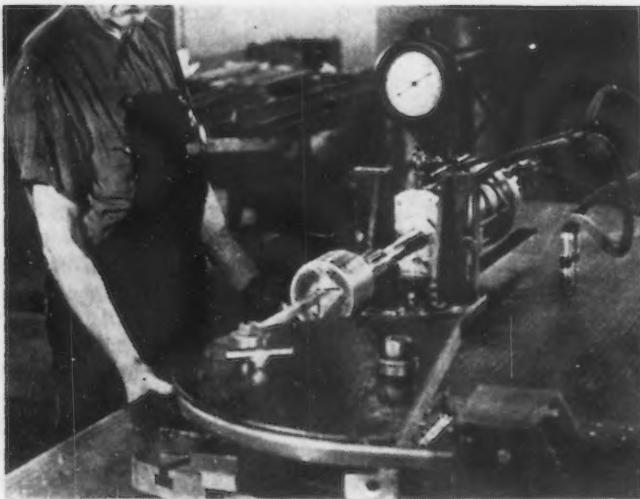
BENDING aluminum tubing by hand between wooden pegs.

are greatly influenced by the method which is used for bending. Small tubing can sometimes be bent satisfactorily by hand without internal or external support. A steel spring slipped over the tube will give external support to help keep the tube round at the point of bend.

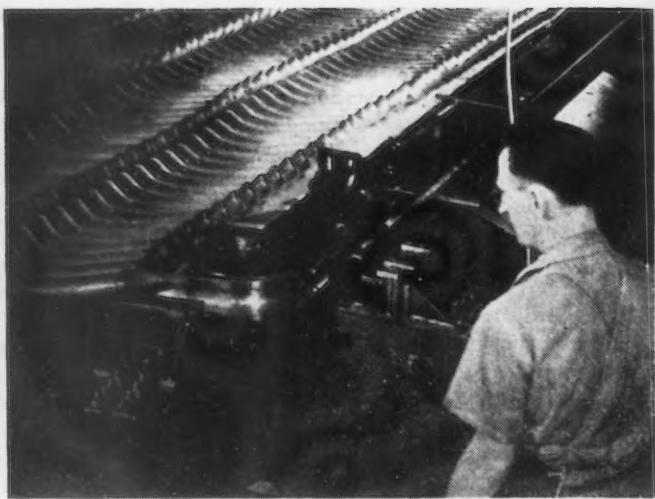
A "hickey" is often used for bending pipe and conduit, or other thick-walled tubing. This consists merely of a piece of pipe about three feet long with a tee at one end. It is usually about one or two sizes larger than the tube to be bent. A vise is used to support the tube and the "hickey" tee is slipped over the end of the tube and used as a lever or tool

ALUMINUM tubing can be bent satisfactorily around a bending form or hub of the radius desired.





A VARIETY of shapes can be bent in a roto-stretcher without wrinkles since the piece is held in tension at all times.



A HYDRAULIC tube bending machine. Note the floating mandrel with the bulb on the end. This mandrel provides inside support and bends with the tube.

boiling water or with steam. Because of its low melting point, Wood's metal may be used with aluminum alloys in the cold-worked or heat-treated condition without impairing the properties of the material. If the bends are extremely difficult and production is too great to use a filler economically, a "snake" or string of steel balls strung on a cable is occasionally used to support the tube. The flexibility of this device permits easy withdrawal after the bend is completed.

A mandrel is usually used in bending tubes in mass production. A common type is the floating mandrel, which has a pivoted end that bends with the tube and can be withdrawn when the bend is completed. Hand operated or power driven bending machines usually take a mandrel with a tapered bulb that closely resembles the

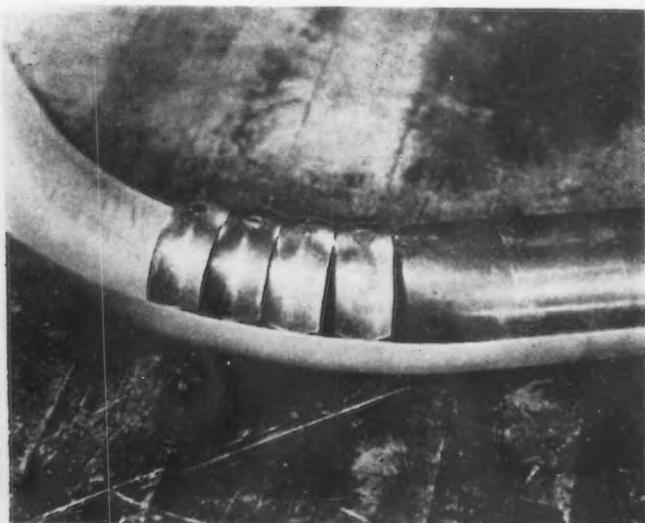
floating mandrel in purpose and operation.

In bending machines, the tube is slipped over the mandrel which is mounted on a rod long enough to accommodate various length tubing. The tube is located between the guide block and the hub, both grooved to fit the tube exactly on the outside. The clamping blocks then hold the tube against the hub so as to make the bend when the hub is rotated. The mandrel supports the inside of the tube during bending and must be located so that its point of curvature is exactly even with the center line on the hub. If the mandrel is ahead of this point the tubing will break; if it is too far back the tube will flatten. Since the tube must slide against the blocks as it is being bent, it should be well lubricated with a heavy oil.

In addition, a wiping block is sometimes needed for bending light-wall tubing, or for making difficult bends where greater support is needed. The block supports the tube more completely as it approaches the bend point and thus prevents buckles from forming at the inside of the bend.

Most aluminum tubing is bent cold, although in some cases hot bending may be employed to advantage since wrought aluminum and its alloys become more ductile with increase in temperature. Tubing that is to be bent hot should be handled with care as aluminum has a lower melting point than iron or copper and is more likely to fracture because of the lower strength of the material at elevated temperatures. The sharpness of the bend to be made and the alloy used will determine the most satisfactory

FOR fairly large production, a "snake" or string of steel balls on a cable may be used to provide inside support in bending aluminum tubing. The snake is easily withdrawn after the bend is made.



THIS machine is bending an aluminum T which will form a stiffener for a large airplane fuel tank. To give maximum support to the shape during bending, the T is forced into the groove in the hub and the back-up block screwed up tight.

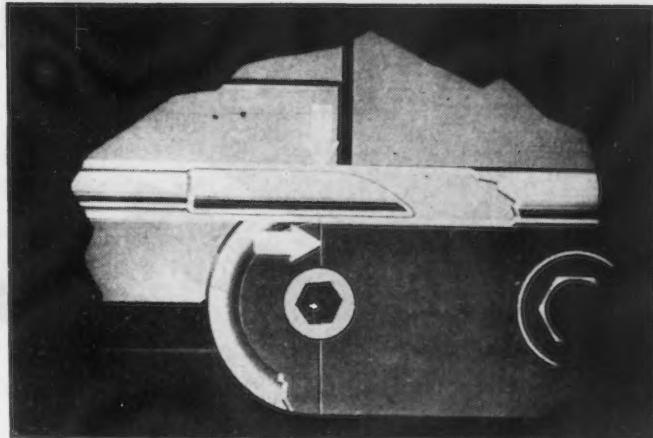


bending temperature to employ.

Heating may be accomplished with a blow torch or an open gas flame by an experienced operator. A soft pine stick rubbed on the tubing will leave a brown char mark when the proper temperature has been reached. For close temperature control it is desirable to use a furnace for heating and a pyrometer for determining temperature. In order to reduce the tendency to anneal the material, hot bending of heat-treated or cold-drawn tubing should be done at the lowest possible temperature and in the shortest possible time. It has been found that on most alloys a temperature up to 400 deg. F. may be used for about 15 min. without affecting the properties appreciably. Dry sand is usually employed as a filler in hot bending.

Square or rectangular tubing is more difficult to bend than round tubing since it has a greater tendency to

• • •
FOR bending aluminum tubing in mass production, a mandrel with a tapered bulb on the end may be used. The mandrel must be precisely located so that the point where the outside edge starts to taper off is exactly even with the center line scribed on the hub.
• • •



collapse. Because of this, exact design and fit are of utmost importance. Although the equipment differs, the general principles for bending round tubing are applicable for bending square or rectangular tubes.

Shapes of various designs are bent on the same general type of machine

used in tube bending. As in tube bending, maximum support must be given the shape at the point of bend through the use of different bending tools for each new design. Lubrication of the metal is important if shape bending is to be carried out successfully.

Copper Brazed Flat Punches

VALUABLE tool steel can be saved by copper brazing a flat tool steel punch onto a mild steel base instead of machining the whole part from a single block of tool steel.

This method can be used to further advantage where a composite of hard and soft steels is required, by brazing a hardenable section to a mild steel section. The hardenable material will respond to subsequent heat treatment and the mild steel will remain soft. Punches can be machined to dimension and heat treated after brazing.

According to the manufacturing research department of Consolidated Vultee Aircraft Corp., San Diego, the method No. 1 illustrated for initially securing the tool steel punch mechanically can be used for square or irregular shaped punches for "pancake" dies, while method No. 2 is desirable for round punches.

Most tools steels can be brazed, with the following exceptions:

18-4-1 high speed steel, with or without cobalt.

4 Mo-6W high speed steel, with or without cobalt.

High speed steel is ordinarily hardened at a temperature in excess of the melting point of copper. The molybdenum type steels can be brazed, however, if they are subsequently heat treated at a temperature not in excess of 1900 deg. F. If the heat-treating specifications allow, the assembly may be brazed at the proper temperature and quenched directly from the brazing furnace. Brazing is done at a temperature of 2050 deg. F. in a protective reducing atmosphere, using commercial copper as the brazing material.

Drawing Wire from High Speed Steel Ingots

HOW to reduce waste from 90 to 10 per cent in the manufacture of cutting tools 1.5 to 5.0 mm. in diameter from 6.0 to 6.5 mm. steel ingots by cold drawing is described by V. Nagornyy in *Novosti Tekhniki*, 9, No. 11 to 12, pp. 24 and 25 (1940) and in *Chem. Zentr.*, 1941, I, pp. 2852 and 2853.

High speed steel ingots, containing 0.72 to 0.79 C, 0.39 to 0.40 Mn, 0.38 to 0.40 Si, 3.9 to 4.3 Cr, 0.2 Ni, 17.9 to 18.4 W, 1.2 to 1.3 V, 0.029 to 0.030 P and 0.028 to 0.029 S, were heated to 1607 deg. F. over a period of 9 hr., held at this temperature for 6 hr., cooled to 1247 deg. F. over a period of 4 hr., heated to 1292 deg. F. in 1 hr. and held at this temperature for

5 hr. The ingots were then cooled to room temperature in another 5-hr. period.

Ingots so treated showed a tensile strength of 15.66 to 15.96 lb. per sq. in., elongation of 11.5 to 12.4 per cent and a Brinell hardness of 95 to 98.

After heat treatment, ingots were pickled for 40 min. in an 8 to 12 per cent solution of sulphuric acid at 113 to 176 deg. F., dried 20 min. at 194 to 212 deg. F. and drawn at a rate of 12 per min. Powdered graphite with or without 30 per cent talc was found to be the most satisfactory lubricant for this process.

After every second draw, the metal was heated to 1256 to 1274 deg. F. for 1½ hr. in a bath containing either

40 per cent NaCl, 40 per cent KCl and 20 per cent Na₂CO₃ or 50 per cent NaCl, 25 per cent K₂CO₃ and 25 per cent Na₂CO₃, then cooled in air, plunged into water at 194 to 212 deg. F. and again pickled as above for 10 min.

After drawing, the wire showed a tensile strength of 14.7 to 15.4 lb. per sq. in., elongation of 3 to 6.5 per cent and a Brinell hardness of 27 to 28. After annealing, the corresponding values were: Tensile strength, 11.3 to 11.8 lb. per sq. in.; elongation 10.4 to 11.7 per cent, and Brinell hardness, 17 to 18.5. When pickled in bundles, steel wire thus made did show surface corrosion.

Broaching vs. Milling



FIG. 27—The operating rod catch of the Garand rifle is a frail part about $2\frac{1}{2}$ in. long. To broach the various surfaces requires nesting type of fixtures to support the work against the cut loads.

ONE of the component parts of the "Garand" Rifle called the operating rod catch, is of unusually frail design as may be seen on Figure 27. To broach this forging, which is made of WD 4020 steel and normalized to 190-220 Brinell hardness, the process engineer has to carefully consider every cut from the point of view as to whether it would be possible to design holding fixtures

that would properly support the piece so as to overcome stresses set up by the cutting tools and arrange them in such a manner that there would not be any possible distortion. Once this problem was solved this component was tooled up to be completely machined by broaching without employing a milling or profiling machine. There is one milling cut, however, that is made in a multiple type

By I. A. SWIDLO

Head Engineer, Production Engineering Department, Springfield Armory

Kingsbury drilling and reaming machine while the part is being drilled and reamed.

The main requirement for the success of the broaching method is uniformity of size and hardness of the forging. Uniform size is required in order to provide proper supporting blocks to fit the irregular form and so as not to overload the cutting tools by an excessive amount of stock to be removed. In order to maintain reasonable uniformity of an irregular form each forging, after it was normalized, trimmed, annealed, and cleaned of scale, is subjected to a cold

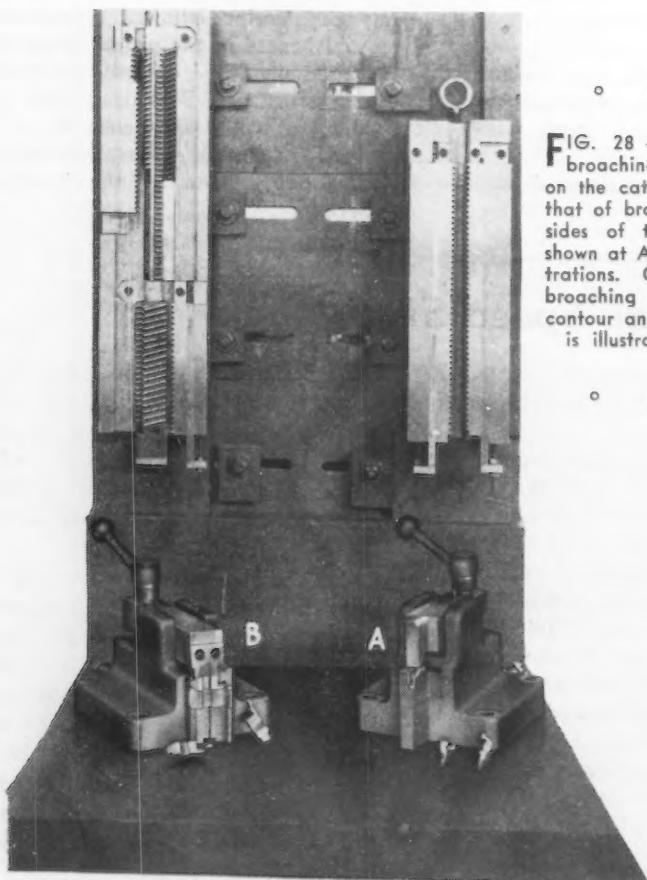
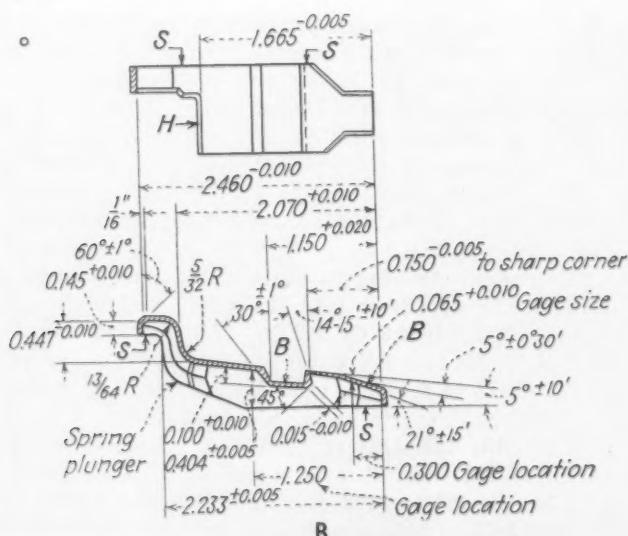
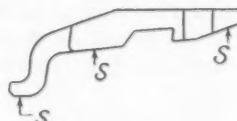
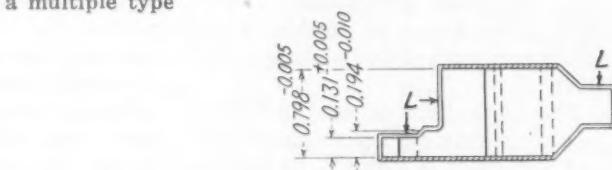


FIG. 28 — The first broaching operation on the catch, Oper. 6, that of broaching both sides of the piece is shown at A in the illustrations. Oper. 6A, broaching of the top contour and both ends, is illustrated at B.



In Manufacturing Rifle Parts . . .

strike in the die on No. 21½ Bliss press.

The first broaching operation is performed on the right hand ram of a 3-ton, 48-in. Cincinnati duplex vertical broach. This operation is known as Oper. 6, "broach both sides," and is shown in Fig. 28 at A. The forging is located against surfaces indicated by the letter L and is supported on surfaces marked by the letter S. The component is held in a simple fixture with a single hand operated clamp. The maximum stock to be removed is 0.090 in., with a chip load on the starting teeth of the roughing tool of 0.005 in., gradually decreasing to a 0.001 in. chip removed by the finishing teeth.

The next operation is performed on the left hand ram of the same machine and is known as Oper. 6A, "broach top contour and both ends." This is an example of advantage No. 3 for broaching referred to in the first article, namely, machining several surfaces simultaneously. It is impossible to machine all surfaces of this operation on a milling machine in one cut. The forging is laid in the fixture on the previously broached left side. It is located endwise from the step marked H, Fig. 28B, and is held against two solid stops marked S

. . . In the fourth part of the article, Mr. Swidlo illustrates broach fixture designs and tooling for machining a small, fragile part. In the fifth and concluding part, data on the economics of broaching vs. milling will be summarized.

and one adjustable horizontal stop with a hand operated clamp. There was some difficulty in broaching the irregular contour due to the necessity of blending several curved and straight surfaces and also cutting a groove with two angular sides, each side at a different angle, which caused further trouble. In the latter case the growth of the chip in the groove crowded the space and rubbed against the sides, giving poor finish. Use of staggered teeth finally solved the problem so that each tooth takes a chip shorter than the slot width and thus allows space for growing. The maximum metal removal is 0.075 in., with a chip load per tooth on the roughing broach of 0.003 in., gradually decreasing to a 0.001 in. chip per tooth on the finishing broach, with the last seven teeth removing only a 0.0005 in. thick chip per tooth.

"broach bottom contour," is performed on the right hand ram of a second 3-ton, 48-in. Cincinnati duplex vertical broaching machine. The fixture and the cut are shown at A in Fig. 29. The part lays in the fixture on its left side and is located endwise by the front end, marked with the letter L, and held against a form block against the top contour, marked S, with a single hand operated clamp. The maximum stock removal is 0.060 in. with a chip load per tooth on the roughing broach of 0.003 in., gradually decreasing to a 0.001 in. chip per tooth on the finishing broach, with the last seven teeth removing only a 0.0005 in. thick chip per tooth.

The left hand ram of the same machine is equipped with a fixture to

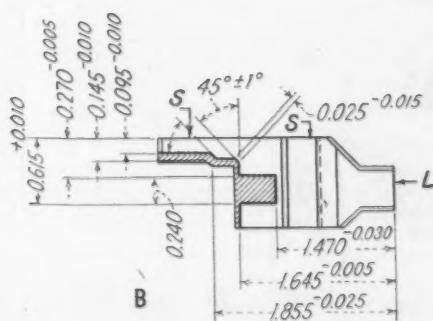
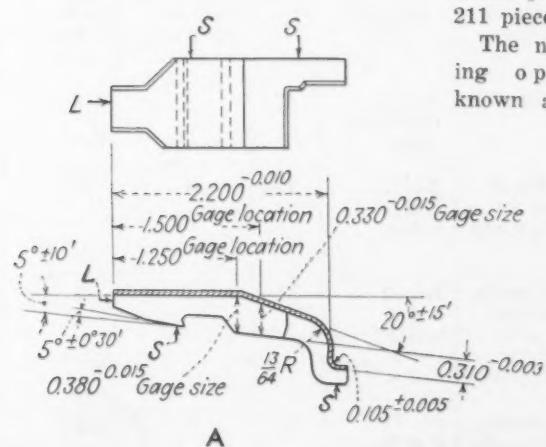
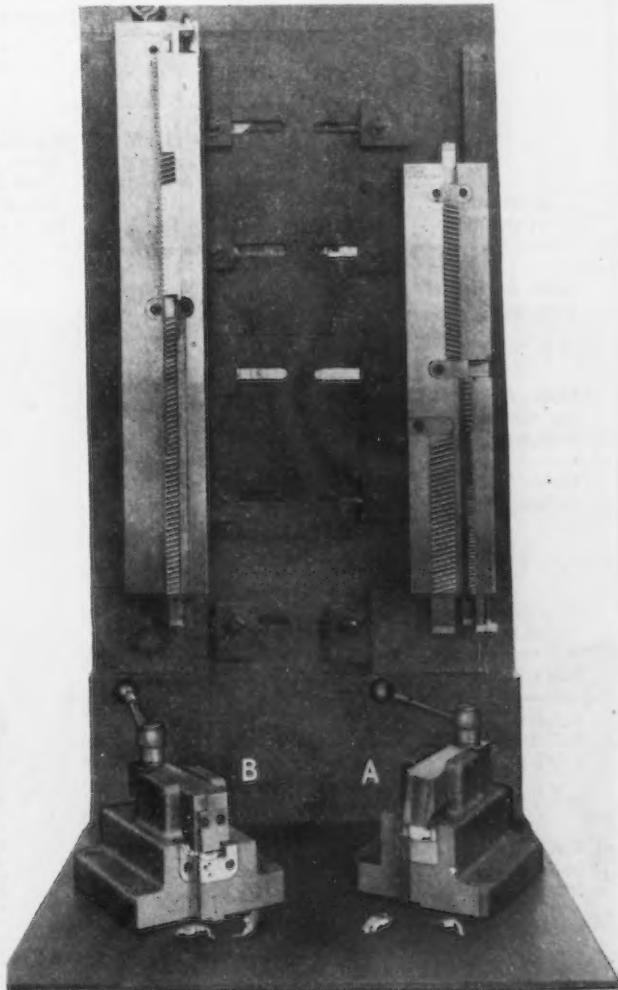


FIG. 29—Cut and fixture for Oper. 7, broaching the bottom contour of the catch, are shown at A. Oper. 7A, broaching the inside of the arm and roughing out the slot is illustrated at B.



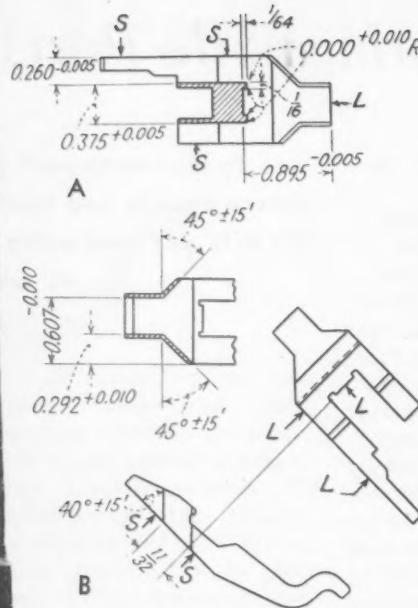
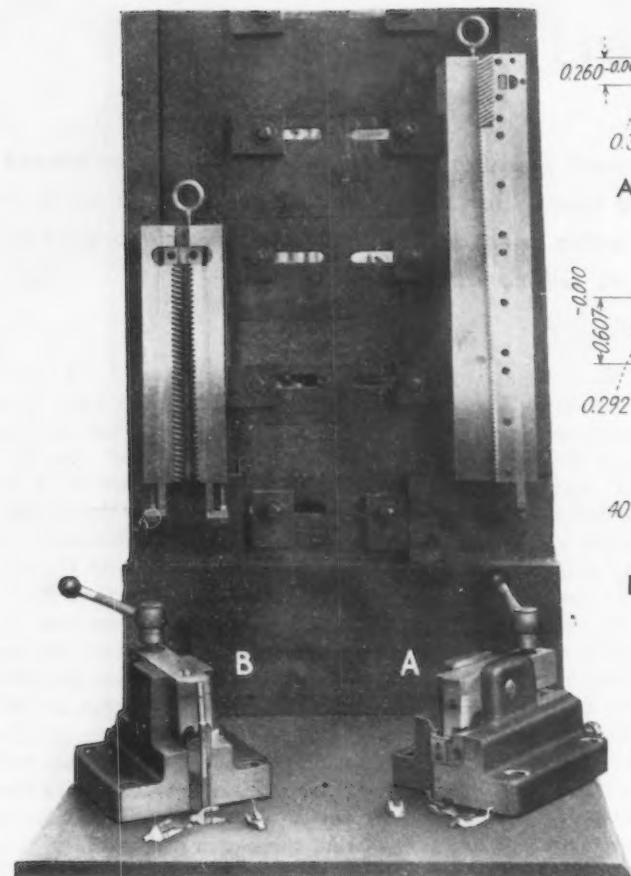


FIG. 30—The last two broaching operations on the catch are illustrated at A and B, respectively. In Oper. 8 the 0.375 in. slot is finish broached (A), while in Oper. 8A, both sides of the front end are broached (B).

hold the catch while Oper. 7A, "broach inside of arm and rough cut 0.375 in. slot," is being performed, as shown at B, Fig. 29. The component, which is located endwise in the fixture from the front end marked L, is laid on its bottom surface on a form fitting supporting block and held against its left side at points marked S with a single hand operated clamp. The maximum metal removal from inside of the arm is 0.065 in. and since the arm is very frail the chip load per tooth on the roughing broach is 0.003 in., gradually decreasing to a 0.0005 in. thick chip on the last five teeth of the finishing broach. However, in rough broaching the slot there is 0.240 in. of metal to be removed in only half of the stroke of the ram and since this is a roughing cut the chip load per tooth is 0.0005 in. and is maintained through the whole length of the cut. Forward and return

TABLE IV
Comparative Table of Broaching vs. Milling of Operating Rod Catch

BROACHING					MILLING				
Description of Operation	Machine Used	Net Pcs. Per Hr.	No. Mach. Req'd. to Produce 1000 Pcs. Per 8 Hr.	No. Oper. Req'd. to Produce 1000 Pcs. Per 8 Hr.	Description of Operation	Machine Used	Net Pcs. Per Hr.	No. Mach. Req'd. to Produce 1000 Pcs. Per 8 Hr.	No. Oper. Req'd. to Produce 1000 Pcs. Per 8 Hr.
Oper. 6—Broach both sides	3-48 in. Cincinnati duplex vertical broach	211			Oper. 6—Straddle mill sides	1-18 in. Cincinnati miller	42	3	1
Oper. 6A—Broach top contour and both ends	Same	211	1	1	Oper. 7—Finish mill contour top and one front end	No. 12 B & S miller	32	4	2
Oper. 7—Broach bottom contour	3-48 in. Cincinnati duplex vertical broach	203			Oper. 8—Contour mill bottom and rear end	No. 12 B & S miller	32	4	2
Oper. 7A—Broach inside of arm and rough out 0.375 in. slot	Same	203			Oper. 14—Profile inside surface of arm	No. 12 P & W profiler	65	2	2
Oper. 8—Rough and finish broach 0.375 in. slot	3-48 in. Cincinnati duplex vertical broach	201			Oper. 11, 11B—Rough and finish mill 0.375 in. slot	No. 12 B & S miller	42	3	1
Oper. 8A—Broach both sides of front end	Same	201			Oper. 12—Mill both sides of front end and 0.125 in. slot	1-12 in. Cincinnati miller	35	4	2
		Totals	3	3			Totals	20	10

ram speed is 38 ft. per min., giving a net production of 203 pieces per hr.

The last two broaching operations are also performed on a 3-ton, 48 in. Cincinnati duplex vertical broach. The right hand ram is equipped with broaches and a fixture to perform Oper. 8, "finishes broach 0.375 in. slot," as shown at A in Fig. 30. The part is located and held in the fixture in the same way as in previous roughing operation except that the right side of the component is supported also to prevent spreading and to maintain the accuracy required as to parallelism of the inside side of the slot. The depth of the cut is 0.540 in. maximum and requires the full stroke of the ram to complete it in one pass with a chip load per tooth of the roughing tool of 0.008 in., middle section at the first tooth, 0.007 in., and the last tooth 0.006 in. The last roughing section has a tooth load on the first tooth of 0.006 in. and the last tooth removes a chip 0.003 in. thick. The last section of broach is a finishing tool and cuts on the sides of the slot as well as in the bottom. The chip load on the side teeth is only 0.0005 in. and the teeth cutting the bottom of the slot remove at first a chip 0.002 in. thick, gradually decreasing to 0.001 in.

The last broaching operation is performed on the left side ram of the

same machine. This operation is known as Oper. 8A, "broach both sides of front end," shown at B in Fig. 30. As indicated by the letter L, the part is located in the fixture from the left side and the bottom of the 0.375 in. slot and is supported in the fixture on the bottom side of the component, which is held with a single hand-operated clamp. The forward and return ram speed is 38 ft. per min., giving a net production of 201 pieces per hr.

Referring to Table IV, showing comparative cuts on broaching and milling machines with their respective production data, it can be seen that three broaching machines and three operators are capable of producing more than 1000 pieces per 8 hr., whereas milling methods would require 20 machines and 10 operators.

It has been mentioned above that this component, namely the operating rod catch, is produced without using a single milling machine. There is a milling cut producing a 0.125 in. slot on a multiple head drilling and reaming machine, the hourly production of which is 140 pieces, and which requires only one operator.

At this point it might be well to illustrate what was meant by previously cited advantage No. 6, namely that surface broaching permits rapid

expansion of production since the initial output per hour on broaching machines is very high. When requirements reached 90,000 components per month for instance, broaching machines were still operating only two shifts, and occasionally three to catch up after breakdowns. However, when orders were received for spare parts and replacement of battle losses, it was necessary to boost production to 4000 pieces in 24 hr. The first step taken was to run the broaching machines three shifts and add a broaching machine to insure uninterrupted production, besides the obvious addition of a Kingsbury machine. If milling machine methods were used, on the other hand, in order to produce 4000 pieces a day, it would be necessary to have net productive capacity for each operation of 200 pieces per hr. Looking at Table IV, it would be necessary to add at least eight milling machines and four operators, and since each machine would have to be run three shifts, the number of operators to be added to the payroll would be three times as many.

[In the fifth and concluding part of the article, to be published two weeks hence, Mr. Swidlo will describe some unconventional circular broaching units and will summarize the economic factors of broaching vs. milling.]

Safety Insert Prevents Tap Breakage

A NEW safety insert for tapping heads developed by three employees of The Glenn L. Martin Co., Baltimore, has almost completely eliminated tap breakage on jobs where this factor previously ran as high as six taps per 8-hr. shift in threading hard, heat treated steel parts.

The first innovation was cutting a groove near the top of each tap, so that if the tap did jam, it would break at this weak point and could be removed from the work. But while this drastically reduced work spoilage, it didn't solve the tap breakage problem. The final solution is a safety insert in the tapping head chuck.

The new insert is a grooved piece of Zamak, a soft zinc base alloy, which replaces the steel jaws formerly used in the chuck. It is identical in size and shape to the jaws it replaces except that the insert is cast in one piece. Each insert can be used only with the size tap for which it is designed. It can be used in any kind of tapping head.

With the new insert, when a tap

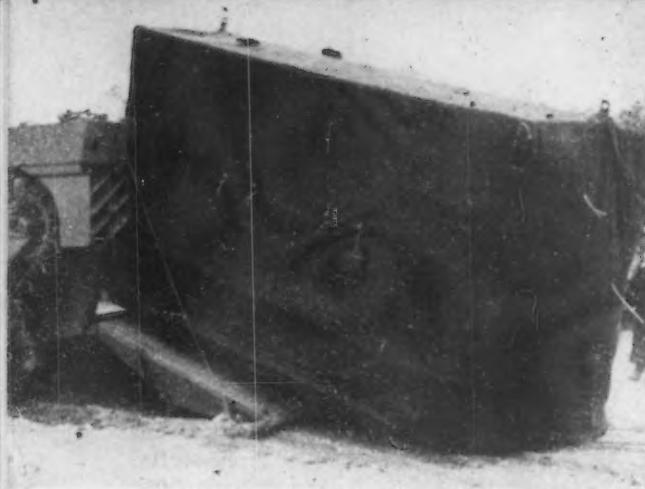
jams, the soft metal of the insert slot wears away, permitting the tap to remain stationary while the tapping head continues to rotate. The metal

is soft enough so that it gives away before sufficient torque is generated to break the tap, but hard enough to hold the tap during normal operations.

WILLIAM STULL, Fred Lang and Ed Lapoz, second shift supervisors at the Glenn L. Martin Co., Baltimore, are shown with the Zamak insert for tapping heads which they designed to prevent tap breakage and reduces the spoilage of parts caused by such breakage.



Navy Repair Facilities



LEFT

FIG. 1—A repair unit is being unloaded from an amphibious tractor (LVT). With the aid of extension arms the canvas cover can be rolled up to serve as an overhanging roof.



AMPHIBIOUS operations call for surprise landings which catch the enemy off balance and are pushed through before he can mount an effective counterattack. The amphibious tractor, more correctly named, Landing Vehicle, Tracked (LVT), is especially designed to fit into such operations, but it is an unhappy situation when in the throes of a landing operation several dozens of these LVT's never get beyond the water's edge or the first hundred feet of beach, mostly because of slight damage that could have been easily repaired were the proper equipment on hand. Attempts to handle this situation by the use of sundry port-

• • •

ABOVE

FIG. 2—Navy repair units established on beach. Each unit may be dragged along the ground on its skids. The unit at the right is the spare parts shop.

• • •



ABOVE

FIG. 4—This unit, known as the retriever, is used to salvage entire LVT's when they cannot be brought up to the landed shops on their own power. A standard jeep engine supplies power for operating the equipment consisting of a winch, a salvage pump, a 200 amp. welding unit and an under-water cutting kit.

• • •

LEFT

FIG. 3—The machine shop unit. A 10 kw. generator (located at the far end) supplies electric power for the machine shop and also current for lighting the other five shops. A radio communication set is operated from its power. The welded steel pipe canopy is used for lifting the unit as well as a support for the roof. Reinforced floor extensions are folded up when moving the unit.



On Sleds for Beach Invasion . . .

Ships requested the Philadelphia Navy Yard to collaborate in the design and field testing of a repair setup for coping with this situation. It was desired that the new repair facilities be of the type that could be made available for immediate repair work, that they be self-sustaining for at least the initial stage of the invasion and be equipped for handling damaged LVT's scattered over a considerable area.

Having decided that the most effective means of transport for the repair units were to be LVT's themselves, immediate steps were taken to develop a platform that would fit into the well of an LVT. It would slide up and down its ramp and also back and forth along the ground. It would carry some 7500 lb. of repair equipment abroad.

A welded skid pallet, 11 ft. 10 $\frac{1}{2}$ in. x 6 ft. 6 in. was designed. This pallet, reinforced by five transverse 4 x 4 in. box girders and the two longitudinal 6 x 6 in. skids, provides a substantial platform with a very favorable strength-to-weight ratio. In working condition, the pallet is made larger by unhinging reinforced extensions on all four of its sides.

To provide a support for a roof that would be at the same time a means of lifting the uncrated unit, a steel pipe canopy frame was welded to the pallet. This framework supports a waterproof canvas canopy which can be lashed to the edge of the sled, thus covering five sides of the unit and which can be spread horizontally on the spring clipped extension arms for providing a roof of greater area.

The tools and machinery selected were arranged for the convenience of the operator, at the same time striving for the best balanced weight distribution. Six units are equipped with all essential repair facilities and materials and a seventh unit, which remains on its LVT, serves as a sort of wrecking vehicle to salvage and bring in for overhaul the damaged craft lying about the beach. The six beached units comprise a machine shop, and shops for hull repair, engine transmission repair, consumable stores, LVT spare parts and for utilities. The wrecking vehicle is known as the retriever.

Each unit carries a snatch block and towing cable which can be rigged for loading or unloading it on an

LVT in a matter of minutes. The lifting eyes on the canopy frame also can be used if a crane is available. Subsequent to unloading, the units are ready for operation in a short period of time.

According to Rear Adm. Edward

L. Cochrane, Chief of the Bureau of Ships, the entire cost is slightly more than that of one amphibious tractor. Thus, when the first tractor which would otherwise be lost is rescued, the entire base has practically paid for itself.

FIG. 5—The consumable stores shop serves as an adjunct to the hull repair shop. It carries oxygen and acetylene tanks, steel sheet and plate, other repair materials and spare tools.

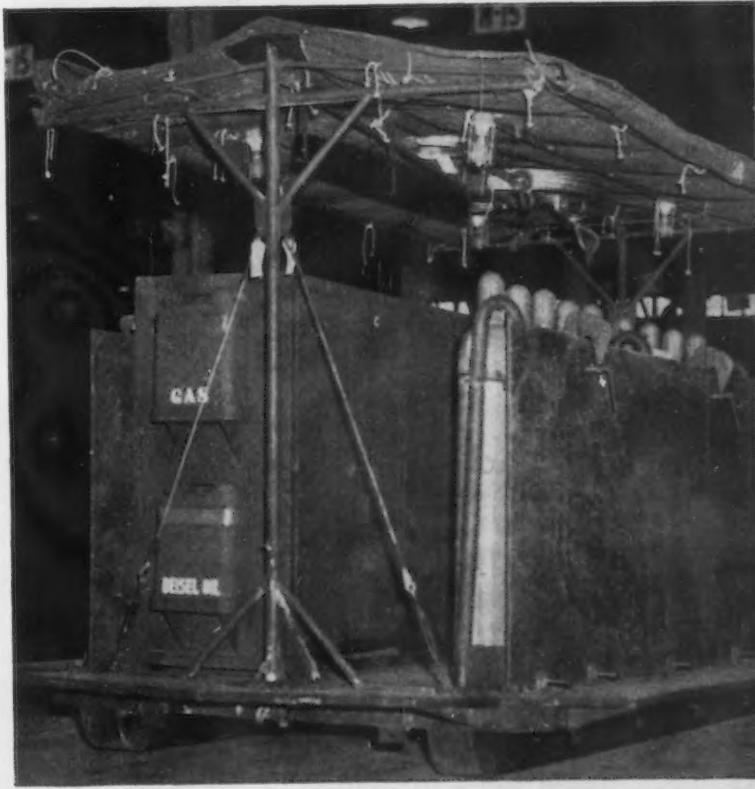
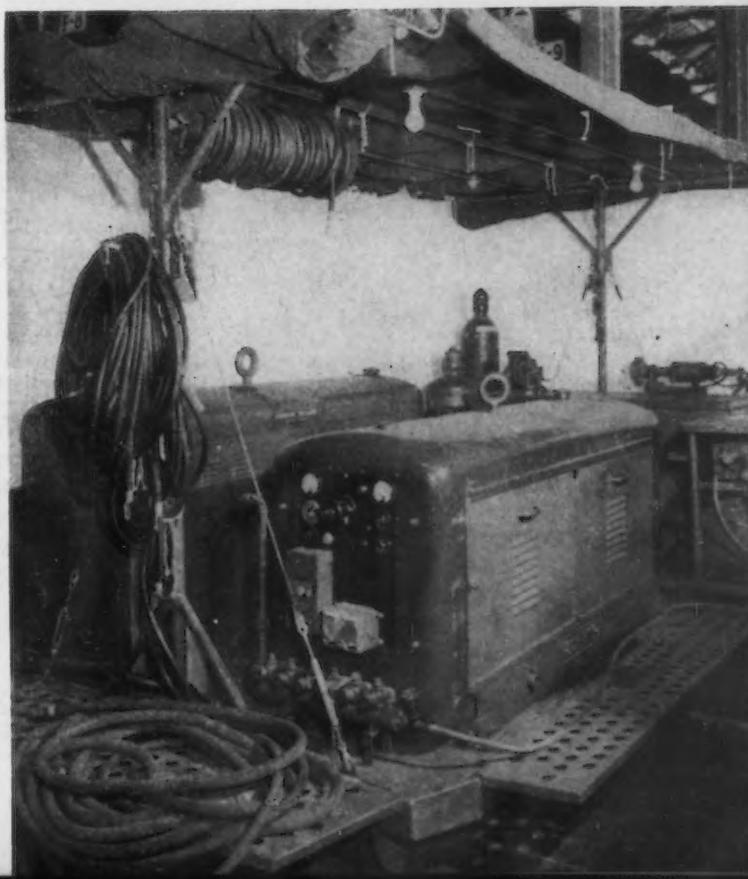
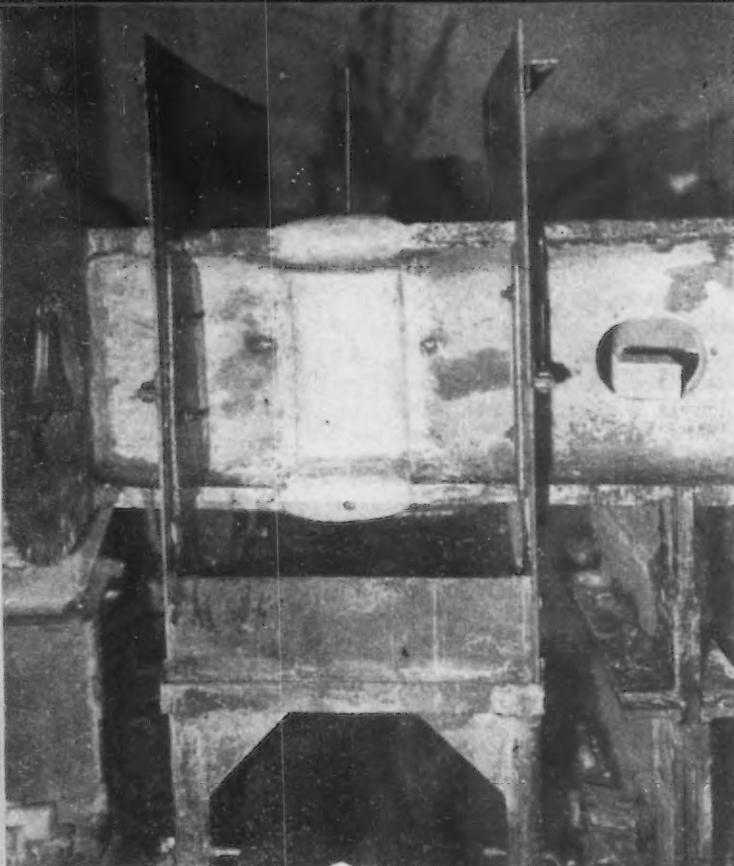


FIG. 6—The hull repair shop includes such major items as a gas-driven air compressor, a 5 kw. generator for auxiliary power, a gas-driven 300 amp. electric arc welder and a portable oil burning blacksmith's forge. The unit is equipped to do a complete hull repair job. Additional equipment and materials are carried on the consumable stores shop.



Welding Sectionally



• • •

LEFT

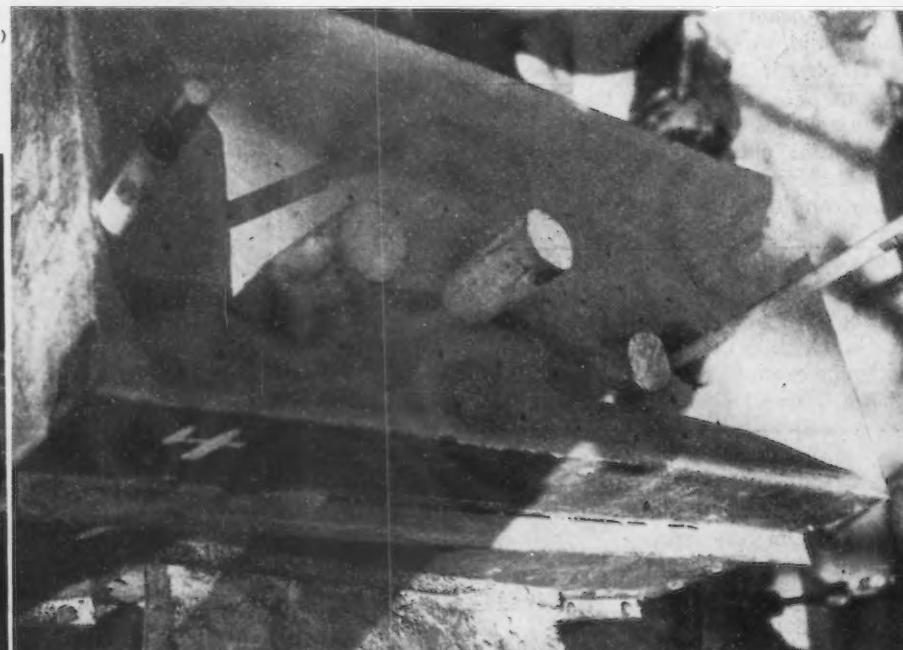
FIG. 1—The first step is to make wax patterns at the joints of the stern frame sections. The mold box is shown prior to sand packing. Later the wax is melted out through the heating gates leaving a cavity in the sand to be filled by the Thermit weld.

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HERMIT welding went into action at the California Shipbuilding Corp., Terminal Island, Cal., when work was begun on Victory ships and the now especially vital attack transports. Due to lack of large foundry capacity and limitations imposed by railroad bridge and tunnel clearances, it was decided to have the stern frames and bow sections on these ships furnished in sections. The stern frames arrive in four- or five-piece sections, having a total weight of 37 tons, 23 tons more than the earlier one-piece Liberty Ship stern frames. The bow stems, which come

BELOW

FIG. 2—Pneumatic sand rams are used to pack the sand in the mold boxes.



ABOVE

FIG. 3—A close-up of the mold box, showing the pour gates at the ends and the three riser plugs in the middle. Perforations in the sand permit the moisture to escape thereby eliminating the possibility of gases causing defects in the weld.

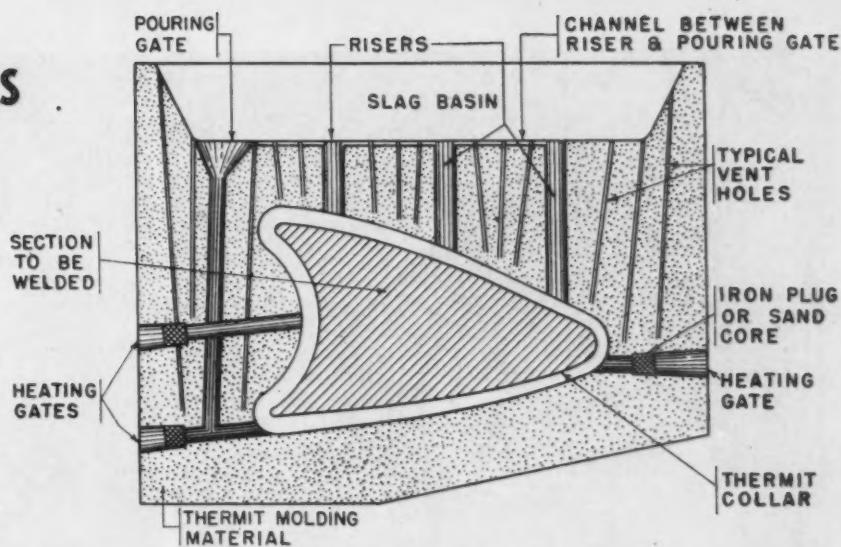
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in two sections, weigh 6 tons. Using the Thermit welding procedure, the problems of manufacture, handling and transportation are simplified and assemblies are produced that are equal in strength to one-piece work.

Thermit, which is a mechanical mixture of finely divided metallic aluminum and metallurgically processed iron oxide, has been used for some time in the marine field for repairing broken stern frames, connecting rods, anchors, shafts and other heavy parts. The Thermit welding operations at Calship entails several operations on one stern frame. First, the metal must be chipped on the ends where

Cast Stern Frames

it is to be welded. The sections are then placed on the welding slab and the ends burned to the proper length. To guard against error in misalignment, the sections are tightly anchored in position with the aid of turnbuckles. The crew next pour wax into the joints to form a pattern for the weld, after which the mold boxes are set in place. Sand is packed in the boxes around the wax pattern. This forms the mold for the weld. Heating and pouring gates and risers are also molded in the box. The wax is melted out through the heating gates thereby leaving an exact cavity for the



ABOVE

FIG. 4—Section through mold box showing preheating arrangement. The preheater burns kerosene atomized by compressed air. When the frame ends are up to around 1700 deg. F., the preheating nozzle is removed and the heating gates plugged with cores.

BELOW

FIG. 5—Overhead view of a stern frame and four mold boxes in readiness for Thermit welding.





FIG. 6—Lowering the double Thermit crucible set-up over the prepared mold box.



FIG. 7—Ignition powder is used to set off the chemical reaction in the Thermit mixture which reaches 5400 deg. F. in 20 sec. Pins at the bottom of the cones are tapped and the metal is allowed to pour into the box.

weld. Pre-heating through the heating gates is done for 8½ hr., bringing the temperature of the frame ends up to 1700 deg. F.

In the meantime, cone shaped crucibles are loaded and prepared for ignition. They are lined with magnesia tar and filled with the prepared Thermit mixture. On top of this is placed a small amount of ignition powder, which is dotted with match-

heads. The crucibles are lowered in position above the mold boxes and the matches are ignited with hot irons. Chemical reaction takes place and in 20 sec. the temperature inside the crucible reaches 5400 deg. F. Hot metal begins to pour into the mold after the pins at the bottom of the cones are tapped by long rods. The aluminum oxide, meanwhile, goes off in smoke and slag.

Ten hours later, the box and sand are removed, the risers and heating and pouring gates are burned off and the weld itself is cleaned. This completes the actual Thermit process, but before the big gantry cranes can lower the frames in place on the ways they must be taken to the machining slab where boring, facing and milling operations are required to produce the finished product.

Fatigue Diagrams for Steels at High Temperatures

FROM tests reported by M. Hempel and H. Krug in *Archiv für das Eisenhüttenwesen*, January, 1943, vol. 16, pp. 261 to 268, it was found that the suitability of a steel to withstand alternating stresses at high temperatures should be judged from both short time static tests and the elongation in tensile-fatigue tests.

Fatigue curves were constructed from tests at up to 932 deg. F. on three heat resisting steels (a Cr-Mo

steel, a 13 per cent Cr steel and a 0.51 per cent Mo steel). A hydraulic pulsator which permitted the free elongation of the specimen during application of the load to be measured was used, and elongation was measured optically at 200 and at 400 diameters.

At temperatures above 572 and 752 deg. F., the Wöhler method was found unsatisfactory because of the non-uniform elongation. For this reason

the results were evaluated from the maximum elongation rates and the permanent elongation. In this way two different limits to the fatigue diagram for each steel were found. These limits enclose a region in which the elongation rate or the permanent deformation lie within permissible limits. The testing of the steels in question led to three characteristic limiting cases having fundamental differences in the shape of the curves.

Automatic Regulated Flux Supply Improves Silver Soldering Production Efficiency

DEVELOPMENT of a new flux supply technique for silver soldering has practically eliminated the principal non-productive finishing operations that have been commonplace steps of procedure in numerous plants. The essence of the improvement is the automatic supply of flux to the joint in the correct amount and at a uniform rate.

Proper fluxing of the joint is more than incidental to the silver soldering process. It performs the necessary function of dissolving and removing oxides and other impurities, and of inducing a rapid flow of the solder through the joint. Since failure to use sufficient flux inevitably results in a sub-standard joint, the tendency is to use more than enough flux in order to be on the safe side.

Under these conditions two difficulties have been encountered, both of which are detrimental to the production rate. First is the discoloration and the accumulation of residue when excess flux is used, requiring a special cleaning operation. The second effect is the generation of porosities by the gases emanating from the volatilized flux. Experiments have been conducted to develop procedures for applying to silver soldering the automatic Gasflux process, which had been used successfully for brazing and bronze welding operations. With a very little modification these procedures are now being widely applied in practice, Fig. 1.

Gasflux Process

In general, the Gasflux process, developed by the Gasflux Co., Mansfield, Ohio, does away with the conventional method of dipping the filler rod into the flux or applying the flux to the work with a brush. Gasflux consists of properly compounded fluxing ingredients carried in solution in a highly volatile and inflammable liquid which evaporates rapidly when exposed to the air. Equipment consists of a container called a Gasfluxer, Fig. 2, which is connected to the fuel gas line supplying the torch. The fuel gas passing through the Gasfluxer picks up the flux in vapor form. The proper amount can be secured by adjusting the flux regulating valve. Fuel gas may be acetylene, city gas, or any other gas that is suitable for the con-

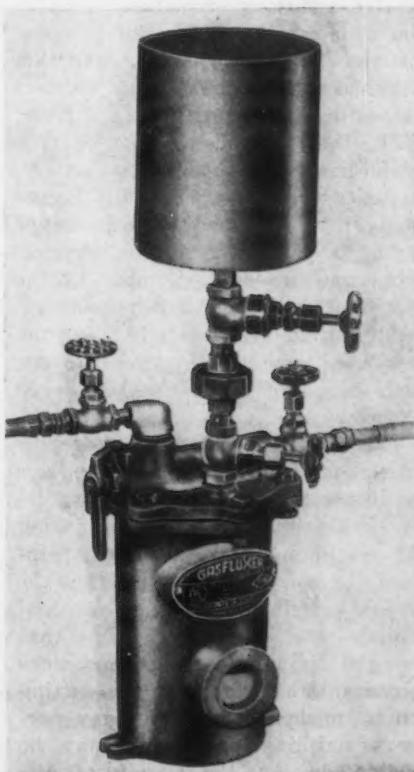


FIG. 1—A Gasflux installation for silver soldering in production. The flux is supplied automatically through the flame.

ditions of the work; and no change needs to be made in either torches or tips. A reserve tank of 1 gal. capacity

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FIG. 2—The Gasfluxer which delivers vaporized flux to the fuel gas stream. Upper valves permit operation with any amount of flux or no flux if desired. Interior of device contains a cotton filter which is kept saturated with the fluxing liquid.



is attached to the Gasfluxer for convenience in refilling without stopping operations, and a sight glass at the bottom part of the container body provides for observation of the liquid level.

Observing Flame

Presence of the vaporized flux in the fuel gas stream imparts a brilliant green color to the flame which tends to mask the inner cone. However, the flame structure can readily be seen with welding goggles, and therefore all adjustments of the torch are made while wearing welding goggles, preferably fitted with green lenses.

Special Joints

Lap and press fit joints (such as the tube within a tube type) necessitate a special technique because these joints usually present very little clearance between the members and it is important to get effective capillary action for a firm bond. Since the flame cannot positively penetrate the small clearance it is not possible to get proper fluxing action by the use of the flame alone and an auxiliary silver solder paste flux must be used as well. In this case the paste flux should be applied in only sufficient quantities to cover the surfaces requiring the capillary action. In the tube-within-a-tube type of joint the paste flux should be applied carefully and lightly to the female part of the joint.

Light-Metal

Permanent-Mold Castings

...The many potential advantages afforded by the combination of the permanent-mold process and the light-metal alloys promise wide-spread utilization for postwar products. This is an abstract of a paper presented before the SAE in Los Angeles.

By L. F. SWOBODA
Aluminum Co. of America,
East Pittsburgh

THE remarkable service which light-metal castings have provided in various war applications can be attributed in no small way to the development and improvement of the permanent-mold casting process. There are many potential advantages afforded by the combination of the permanent-mold process and the light-metal alloys. Too frequently, however, the advantages are not completely realized because the buyer fails to consult the supplier in the early stages of his design. In order to develop the most economical and practical design, it is essential that the buyer and the foundry cooperate from the beginning by discussing all features such as design details, available alloys, and service requirements.

The process of permanent-mold casting consists of pouring molten metal into a hot metal mold or die. It differs from the die casting process in that the metal is fed into a hot mold cavity by the force of gravity rather than into a water-cooled die by pressure. A variation in the permanent-mold process, is also frequently employed and greatly expands the use of the permanent-mold process. It consists of using a dry sand core for the interior surfaces and a metal mold for the exterior surfaces. The semi-permanent-mold method is used when it is impossible to remove steel or iron cores from the interior of the finished casting. It may also be used when a smoother surface is required on the exterior than could be obtained if the part were made as a sand casting. Furthermore, by the semi-permanent-mold method most of the metallurgical advantages of the per-

manent-mold process can be obtained even though dry sand cores have to be used in part.

Castings made by the permanent-mold process have many advantages, the most outstanding of which is their metallurgical superiority over other cast products. If the metal is correctly poured into a properly designed mold (assuming the casting is well designed for the process), solidification takes place progressively; that is, the part of the casting farthest removed from the sprue and risers solidifies first and is fed by the successive additions of molten metal as the mold is filled. It is this progressive feeding of the casting, together with the rapid chill the metal receives on coming in contact with the metal mold, that produces a dense, fine-grained metal, the mechanical properties of which are substantially higher than those obtained in other type castings. Furthermore, the physical properties are also enhanced by the fact that well designed permanent-mold castings are unusually free from the more common foundry defects, such as dross, air pockets, and porosity.

The general soundness of permanent-mold castings also reduces the losses resulting from foundry defects which may be uncovered during the machining and finishing operations. It is frequently found that the amount of finish necessary for machining may be reduced below that required for sand castings, and since the essential surfaces of the casting can be made smooth, for many purposes finishing operations may be eliminated. As the result of the

smoothness and accuracy possible with the permanent-mold process, many holes can be cored to size, thereby eliminating this machine operation entirely.

Pressure tightness is another advantage which is inherent in permanent-mold castings. This quality is often the determining factor in selecting permanent-mold castings rather than sand castings for a specific application.

Permanent-mold castings are not precision products and, consequently, certain tolerances cannot be held too closely. Their dimensional accuracy, however, is intermediate between that of sand castings and die castings. Somewhat greater tolerances are necessary in semi-permanent-mold castings, especially when a fairly large portion of the surface is in contact with sand.

A number of factors are involved in determining the cost of permanent-mold castings. When comparing the cost of permanent-mold equipment with sand foundry equipment of similar production capacity, it is frequently found that the cost sometimes favors one process and sometimes the other and only a careful analysis of the factors involved will give the answer. It must be remembered, however, that when a large number of castings is involved, the mold cost becomes a practically negligible item. As the number of castings produced increases, the initial cost of the mold is distributed over a greater number of items. Furthermore, it is the foundry's responsibility to maintain or replace permanent-mold equipment so long as it is considered active, and the buyer has only the cost of the first mold to consider. On the other hand, it is the buyer's responsibility and expense to keep sand foundry equipment in good repair.

It may also be found that the smoothness and accuracy of castings produced in permanent molds eliminate sufficient machining to more than offset the cost of mold equipment, even in the case of very lim-

ited production runs. In castings requiring considerable surface preparation and machining, it is often economical to employ the permanent-mold process for a small number of castings because of the saving in machining and finishing cost.

In some cases, the decreased amount of metal which must be removed from the individual surface of a permanent-mold casting will result in lower machining costs. Actually, however, the amount of metal to be removed is not nearly so important as the great variation in uniformity between sand and permanent-mold castings. While the removal of a greater amount of metal can easily be accomplished by increasing the depth of cut, the efficiency of a large production machining set-up is dependent upon the uniformity of the casting. When castings are not uniform, minor set-up adjustments must be made for each piece and this decreases the output per hour. Because of their greater uniformity, permanent-mold castings can be machined more cheaply than comparable sand castings since a greater number can be machined per hour. The larger the production, the more apparent these savings become.

Another item to consider in determining the cost of permanent-mold castings is that less metal is required per piece. This results from the smaller amount of finish that is required and the smaller tolerances. This saving in metal cost is self-evident, especially in the case of quantity production runs.

To give the buyer the lowest mold cost and quickest delivery date, it is essential that the foundry have access to a well equipped and well manned machine shop. In addition to the usual standard machine tools and power driven flexible shaft tools, duplicator and profiling machines are very desirable. A large number of standard and special milling cutters are also necessary, but a well rounded supply of such cutters is usually accumulated only after years of mold building.

There are a number of important factors which should be considered during the design of light-metal permanent-mold castings. A careful analysis of these factors will aid the designer in obtaining higher quality and greater economy. For example, a large percentage of castings now made in sand molds could be made in permanent molds without resorting to design changes. With a few minor changes in design, however, it is frequently possible to obtain greater production, to simplify the mold construction or, as the case may be, to

permit the use of a full permanent mold instead of a semi-permanent mold.

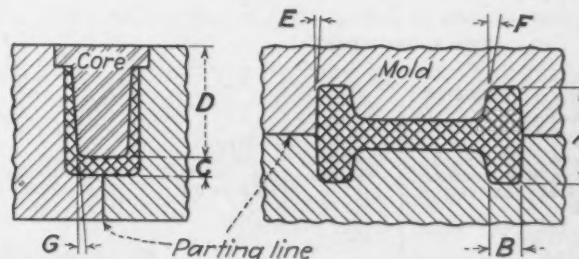
One of the chief requirements in the design of permanent-mold castings is to allow for the withdrawal of cores from the casting and the removal of the casting itself from the mold. In some instances, the castings are of an inherent design which cannot be changed sufficiently to permit the use of a solid core. For this class of castings, it is necessary that split cores, multiple piece molds, or sand cores be used. In other cases, however, a permissible change in design

mold designer is placing parting lines, gates, and risers. In addition, the designer should know the exact position of the buyer's locating points so that both the supplier and buyer will check the accuracy of the casting from the same spots.

It is sometimes found desirable to cast inserts of other metals in light-metal permanent-mold castings. Since the light-metal alloys have different coefficients of expansion from other metals, a definite foundry technique is required for the economical and proper use of inserts.

Wherever practicable, uniform sec-

TABLE I



- (A) ACROSS PARTING LINE
± $\frac{1}{64}$ for 1 in. or less—above 1 in. add 0.002 to tolerance per inch of length.
- (B) BETWEEN POINTS PRODUCED BY ONE PART OF THE MOLD
± $\frac{1}{64}$ for 1 in. or less—above 1 in. add 0.001 to tolerance per inch of length.
- (C) BETWEEN POINTS PRODUCED BY THE CORE AND MOLD
± $\frac{1}{64}$ for 1 in. or less—above 1 in. add 0.002 to tolerance per inch of length.
- (D) MAXIMUM LENGTH OF CORE SUPPORTED TO ONE END
Diameter of core x 10.
- (E) OUTSIDE DRAFT
1° minimum—3° desirable
- (F) DRAFT IN RECESSES
2° minimum—5° desirable
- (G) DRAFT ON CORES
 $\frac{1}{2}^{\circ}$ limited—2° desirable

Note:

- (1) Minimum diameter of cores = $\frac{1}{4}$ in.
- (2) Minimum web thicknesses for distance of:
3 in. or less = $\frac{1}{8}$ in.
3 to 6 in. = $\frac{5}{32}$ in.
Over 6 in. = $\frac{3}{16}$ in.
- (3) Machine tool locating points should be indicated.
- (4) Allowances for machining:
Castings up to 10 in. long = $\frac{1}{32}$ in. minimum, $\frac{3}{64}$ in. desirable.
Castings over 10 in. long = $\frac{3}{64}$ in. minimum, $\frac{1}{16}$ in. desirable.
Surfaces formed by sand cores = $\frac{1}{16}$ in. minimum.
- (5) Minimum radius of fillet:
Radius should equal average thickness of joining walls.

will make possible the use of a single piece core, thereby reducing the production costs.

When castings are being designed to facilitate their production, the designer should strive for a minimum number of cores, since their replacement in the mold requires more handling and slows down production speed. To minimize maintenance cost extremely long, thin cores should be avoided whenever possible. Furthermore, the number of mold parts should be as small as possible since speed of operation is available in maintaining proper mold temperature.

It is necessary for the supplier's designer to know where the jig spots are located. The marking of jigging points on the blueprint will aid the

tions should be maintained throughout a permanent-mold casting. Section uniformity helps not only to simplify the gating and feeding problem, but also to equalize the rate of solidification, a very important factor in controlling the quality of permanent-mold castings. With any kind of cast product, when sections vary in thickness, there is a tendency to set up internal strains in the casting and cause non-uniform solidification, which may lead to shrinkage and cracking. In a design where light and heavy sections join, a gradual increase in thickness of the thinner section toward the point of junction will help considerably. In service, this blending assists in distributing loads over a larger area of the casting and thereby fre-

quently eliminates undesirable stress concentrations.

The minimum section thickness possible in light-metal permanent-mold castings depends very materially on the size, pressure requirements, and intricacy of the casting. In general, however, the minimum section thickness which can be cast in permanent molds is approximately $\frac{1}{8}$ in. When extremely thin sections are required, however, it may be necessary to make an engineering compromise since it is necessary to sacrifice smoothness of surface to attain the desired thinness.

Limitations on section thickness also apply to the design of ribs in

light-metal permanent-mold castings. Particular attention should be given to thin ribs, particularly those which are highly stressed. Their rapid cooling in the mold may set up casting strains which result in a lowering of the strength of the casting and possibly in cracks.

The designer should provide generous fillets at all wall intersections in a permanent-mold casting to help prevent shrinkage and cracking at these points. Sharp internal corners constitute a source of weakness in castings and should be avoided.

The use of multiple-piece and dry sand cores broadens the scope of the

permanent-mold process and makes possible the production of some castings that could not otherwise be made by this method. If the "undercut" which necessitates multiple-piece cores can be eliminated, however, a saving in cost will result.

The amount of machine finish allowance necessary for permanent-mold castings will usually be less than that for sand castings. Naturally, larger castings will require more allowance than smaller ones.

As mentioned earlier, light-metal permanent-mold castings have greater dimensional accuracy than sand castings but cannot be held to tolerances which are as close as those possible by the precision die casting process. It is possible, however, to hold certain dimensions—either linear or thickness dimensions—within close limits. In such cases, the closer tolerances may be reflected in the increased cost of the product or in the lower production rate of the mold. From the standpoint of economy, the designer should not specify tolerances closer than are absolutely necessary.

There is no set rule for specifying what commercial tolerances apply to castings of a given size or weight class, because the design details of the various castings have a greater effect on tolerances than do size and weight. The tolerances shown in Table 1 have been based on years of experience and are considered good commercial practice. This table should, however, be used only as a guide, and whenever any dimensions are to be maintained within certain limits, regardless of what they may be, the foundry involved should be consulted.

In summary, light-metal permanent-mold castings are distinctly a quality product and should be considered when *any one* of the following conditions exists:

- (1) Superior cast metal structure is desired.
- (2) Smooth surfaces are desired in the as-cast condition.
- (3) Uniform size, weight, and section thickness are desired.
- (4) Reasonably large production quantities are contemplated.
- (5) Most economical production setup is desired to reduce cost of casting and to maintain a high production rate.

An important fact to remember is that many large castings, as well as medium size castings can be produced economically by the permanent-mold process. A complete analysis of all the cost factors entering into the finished part, including the casting cost, finishing cost, assembling cost, and so forth, is advisable.

TABLE II
PROPERTIES OF SOME LIGHT-METAL PERMANENT-MOLD ALLOYS

Alloy and Heat Treatment (Alcoa Numbers)	TYPICAL PROPERTIES					CHIEF CHARACTERISTICS AND APPLICATIONS	
	TENSION			Brinell, 500 Kg. Load, 10 MM. Diameter Ball			
	Yield Strength, Lb. Per Sq. In. (Set = 0.2 Per Cent)	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent in 2 In.				
43	9000	24,000	9.0	45		Alloy has excellent casting characteristics; casting well in thin sections; excellent weldability; fair machinability; good leak tightness; good corrosion resistance; excellent Alumilite characteristics.	
B113	19,000	28,000	2.0	70		Excellent casting characteristics; a good general purpose alloy; excellent machinability; good weldability.	
C113	28,000	30,000	1.0	80		Excellent casting characteristics; good leak-tightness, a good general purpose alloy having greater leak-tightness and higher yield strength than obtainable in B-113 alloy.	
A132-T551	28,000	36,000	0.5	105		Fairly good foundry characteristics; approximately 15 per cent less thermal expansion than in other aluminum alloys; good high-temperature properties, particularly in 500 to 600 deg. F. range; takes a good Alumilite coating. This alloy and heat-treat combination is used for cast pistons of all types and sizes.	
138	24,000	28,000	0.5	100		Excellent foundry characteristics; retains its hardness well at elevated operating temperatures. Used for electric hand-iron sole-plates.	
B196-T6	33,000	45,000	7.0	90		This alloy in the condition noted combines good foundry characteristics with good physical properties, good machining qualities, and shock resistance. It is possibly the most generally used of the heat-treatable alloys.	
A214	16,000	27,000	5.0	60		Fair foundry characteristics; excellent corrosion resistance; excellent machinability; takes a good Alumilite coating; welding is not recommended. This alloy particularly suited for cooking utensils.	
355-T6	27,000	43,000	4.0	90		Excellent foundry characteristics; good leak-tightness; good weldability but must be heat-treated after welding; takes a good Alumilite coating; good corrosion resistance; good machinability.	
AM240-T6	16,000	35,000	4.0	60		Magnesium base permanent-mold alloy. Good casting characteristics; good mechanical properties; good leak-tightness; excellent machinability; weighs only 0.066 lb. per cu. in. A good general-purpose alloy.	
AM260-T6	20,000	38,000	3.0	78		Magnesium base permanent-mold alloy. Good foundry characteristics; good corrosion resistance; good pressure tightness; excellent machinability; weighs only 0.066 lb. per cu. in. The alloy is widely used for highly stressed and intricate structural castings.	

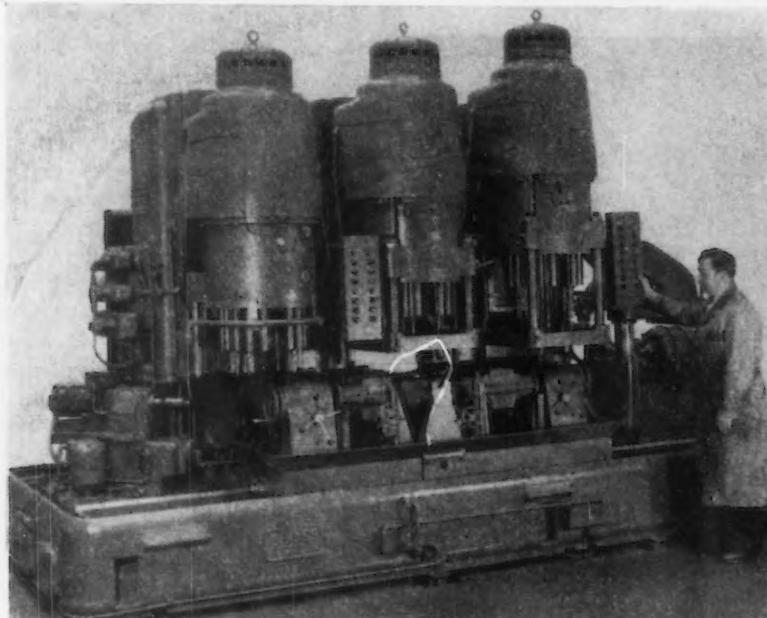
New Equipment . . .

Machine Tools

. . . Recent developments in drilling, broaching, gear finishing, tapping and other types of machines are described in the following pages.

A SPECIAL transfer type 3-station machine which drills, countersinks and taps assembly holes in the bowl face and simultaneously two

developed by *American Broach & Machine Co.*, Ann Arbor, Mich. Control is by a hand lever which operates a 4-way hydraulic valve. The maximum

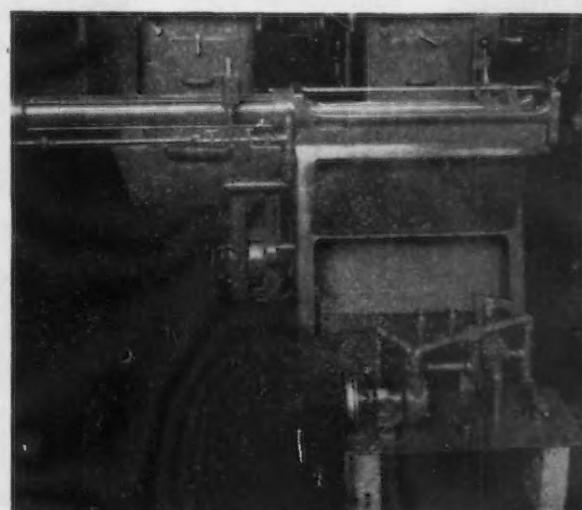


grease drain holes in the side of the bowl in the front and rear axle housing of 4 and 6 ton heavy trucks has been announced by the *Cross Co.*, 3250 Bellevue Avenue, Detroit. The machine has three 10 hp. independently powered, multiple spindle heads mounted on a common base with a table that indexes the work from station to station. The table carries a work-holding fixture which is arranged to accommodate both front and rear axles. The multiple spindles, too, are arranged in the heads to permit working on the two different diameters of bowl faces. The spindle units at the left and below the drilling and tapping heads operate simultaneously with them in processing the two bowl holes. Only one unskilled operator is required.

Light Broaching Machine

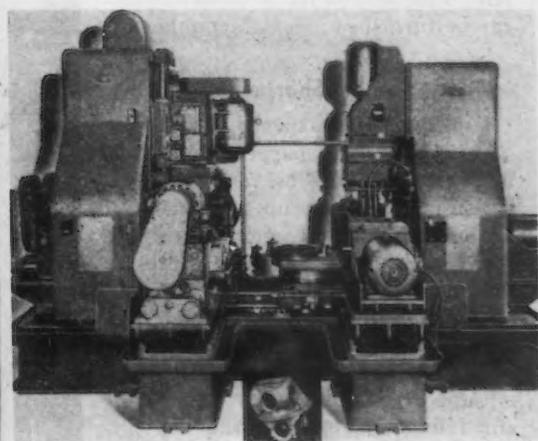
DESIGNED for pull broaching and push broaching on certain types of work and for light push assembly jobs, a horizontal 1 ton, 20 in. stroke broaching machine has been

stroke of the machine is 20 in. and the maximum time for the cutting stroke is 4½ sec. The oil reservoir in the bottom of the base is provided with an oil level gage and a drain cock. Lubricating oil tank, pump, spout, strainers, chip trough, gage and varied pull and push heads are furnished extra.



Drilling and Tapping

A N 8-way drilling and tapping machine which combines multiple drilling and tapping has been developed by *Snyder Tool & Engineering Co.*, 3400 E. Lafayette, Detroit 7. The machine is built in two sections. One side is used for drilling, the other for tapping. The part is loaded in the center



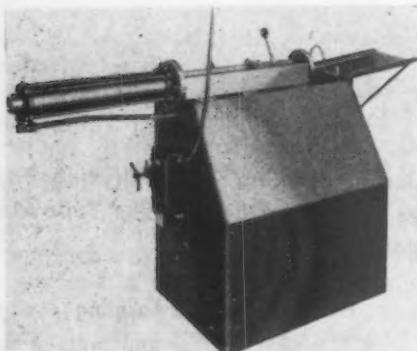
position between the two work stations and is clamped in a locating fixture mounted on a table for 180 deg. index. Two index pins position the fixture and the carriage assembly in preparation for the drilling cycle. The multiple heads and bushing plates that drill the various flanges in the part are mounted on Snyder self-contained, hydraulic guide bar units and all four heads are interchangeable with

other heads having various numbers of spindles, set in various positions.

Broaching Machine

A HYDRAULICALLY actuated broaching machine has been developed by *Zagar Tool Co.*, 23880 Lakeland Boulevard, Cleveland. Features of the machine include a self-contained coolant system, hardened and ground ways and adaptor plate, and automatic

NEW EQUIPMENT



stop control. The machine has a maximum stroke of 20 in. and the plates accommodate broaches up to 1½ in. diameter, either key, threaded or grooved type. The cutting speed is variable, the set rate being 30 in per min. Pull is 6000 lb. A broach holder can be furnished as extra equipment.

Broad Sharpener

A BROACH sharpener, Model CS2, which will sharpen round and flat broaches, spline and serrated types, etc., ranging up to broaches 7 ft. long and with a maximum diameter of 6 in. (8 in. maximum width for flat broaches) has been announced by Colonial Broach Co., Harper Station, Detroit 13. The sliding head is of lightweight alloy construction and is supported and guided on by full anti-friction double row rollers. Available at slightly extra cost is a feature which makes possible the maintaining of identical steps per tooth in regrounding broaches. Another feature available at added cost is a special roller curtain design for protecting the ways of the machine when the table is moved to one side or the other. On the standard machine, metal guards are provided for this purpose. Universal positioning and movement of the grinding wheel are obtained by the use of a vertical column, a cross slide mounted on a graduated cross slide support and a graduated wheel head mounting.

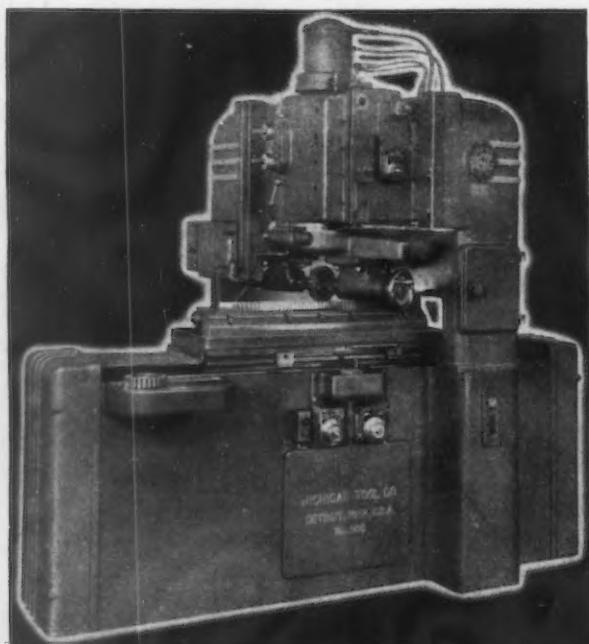
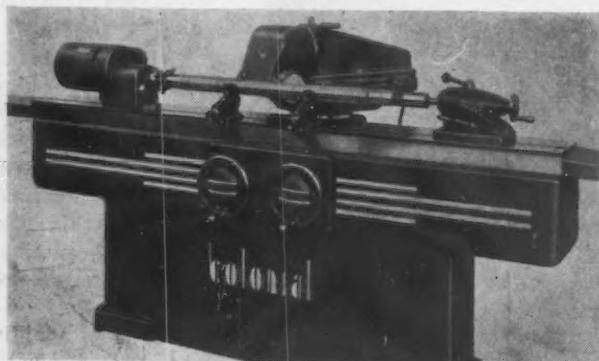
Headstocks for cylindrical broach sharpening are provided with reduction gearing giving spindle speeds of 200 and 400 r.p.m. If desired, the CS2 can be obtained without head and tail stocks, steadyrests, etc., for sharpening flat broaches only.

Indexing Machine

A VERTICAL 8-station indexing machine designed to perform a series of operations on a universal joint body, without removing the workpiece from the machine has been announced by Davis & Thompson Co., 6411 West Burnham Street, Mil-



waukee 14. Power for the spindles is supplied by a 25 hp. motor. Feed and rapid traverse are accomplished by a 1½ hp. Thy-motrol drive in conjunction with a two-speed electrically operated gear box built into the top of the machine. Spindle heads are driven through a spline



shaft and fed by two screws equipped with adjustable nuts. Feed can be varied from ½ to 7 in. per min. and rapid traverse is 100 in. per min. The machine is hand locked and manually indexed. Production at a 2 in. per min. feed is 60 pieces per hr.

Gear Finishing Machines

AN improved postwar line of its series 900 rack-type crossed axis gear finishing machines has been announced by Michigan Tool Co., 7171 East McNichols Road, Detroit 12. Completely hydraulic in operation, the series incorporates two separate hydraulic systems, one for the operation of the table and one for the head feed. Lubricants and coolants have entirely separate outlets. Automatic lubrication has been extended to the rack table ways which are of hardened and ground dovetail rather than inverted V design and which incorporate improved adjustments for wear. During the cutting cycle the work is reciprocated at a predetermined rate of speed across the rack while the rack reciprocates longitudinally in mesh with the work. The machine finishes gears up to 8 in. diameter with maximum length between centers of 18½ in. Pre-compensation for possible heat-treat distortion of gears subsequent to finishing is provided for. Electrical controls have been improved from a safety and durability standpoint, with start and stop buttons stations, etc., operating on 110 rather than power-line voltage.

NEW EQUIPMENT

Sawing Machine

A HIGH speed sawing machine adaptable for many sawing conditions has been announced by *Continental Machines, Inc.*, 1301

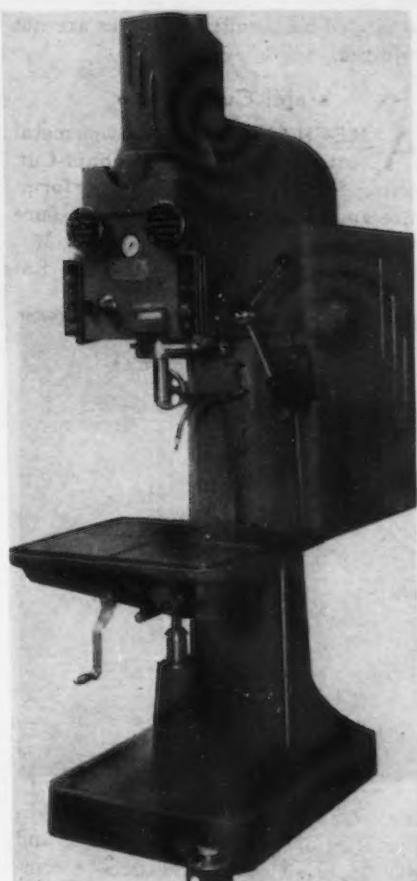


Washington Avenue South, Minneapolis 4. The DoALL Zephyr features a 36 in. throat depth and 20 in. work thickness capacity with speed ranges of from 1500 to 10,000 ft. per min., controlled by a Speedmaster variable speed pulley. A "job selector" dial shows the saw control factors for the shaping of 104 basic materials. Automatic hydraulic brakes on upper and lower wheels and all moving parts housed behind walls of steel protect the operator. The high speed saw guides are adjustable for all $\frac{1}{4}$ to $1\frac{1}{2}$ in. wide saw bands. The machine is shipped complete with 20 assorted saw bands ready for operation. The saw will accomplish friction cutting on a wide range of metals. Its versatility extends to the use of various kinds of bandsaws, such as spring tempered, metal cutting and the new DoALL buttress tooth saw, since its speed range is wide enough to provide the most efficient cutting speed for all types of saws.

Tapping and Threading Machine

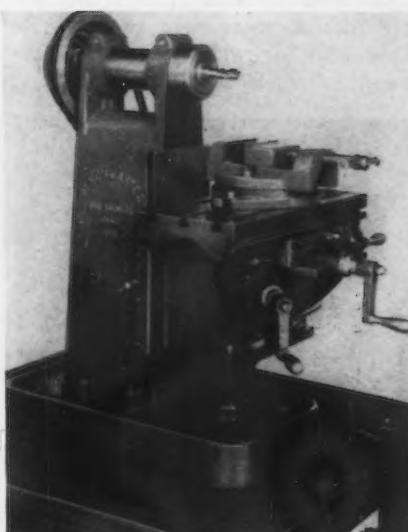
A TAPPING and threading machine which is lead screw controlled but which has rapid approach and retraction of the spindle has been announced by *Cleveland Tapping Machine Co.*, 1725 Superior Avenue, Cleveland 14. Rapid approach and retraction of the spindle is controlled by two air cylinders which exert no

air pressure on the spindle when tapping. The approach can be set to stop within 0.010 in. of the hole. Rapid retraction becomes effective the instant the tap leaves the work. The tap is removed at twice the tapping speed. These factors make it possible to tap as high as 2000 holes per hr. Control of vertical travel of the spindle to within 0.005 in. and the rotation within to one-tenth of a revolution makes the machine especially adapted for blind hole tapping. The machine has a tapping capacity of from $\frac{1}{8}$ to 3 in. in steel and will tap Class 3 fit on a production basis.



Bench Milling Machine

A N improved bench milling machine for vertical or horizontal milling has been announced by *Benchmaster Mfg. Co.*, 2952 West Pico Boulevard, Los Angeles 6. The machine is converted from a vertical to a horizontal one with overarm and arbor by simply interchanging the spindle attachments. Features of the machine include ball thrust bearings on the vertical lead screw, gib locks on the table, saddle and knee for insuring accuracy, and an equalized weight distribution that provides rigidity enough to do heavy work. The horizontal mill includes an overarm attachment for outboard support for the end of the arbor in taking



heavy cuts or for slitting operations. The vertical mill attachment features a spindle arm which swings 60 deg. each side of center graduated in degrees. Screw feed is standard but rack and pinion feed is also available. Longitudinal travel is $8\frac{1}{2}$ in. on a standard table, $12\frac{1}{2}$ in. on a special table. Traverse travel is $5\frac{1}{2}$ in. Vertical travel is $8\frac{1}{2}$ in. on the vertical mill and $9\frac{1}{2}$ in. on the horizontal mill.

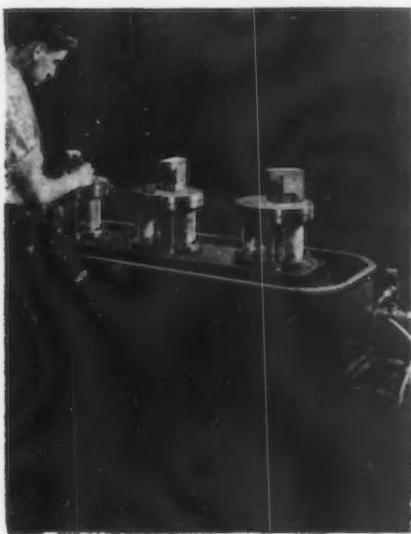
Center Lapper and Drill

A SINGLE machine which performs both center lapping and drill press operations, the "2-in-1," has been announced by the *Dalzen Tool & Mfg. Co.*, 12255 East Eight Mile Road, Detroit 5. One simple adjustment is said to be all that is necessary to change over the machine from center grinder to drill press or vice versa. Easily portable, the machine weighs 165 lb. Standard length between centers is 39 in. but other lengths are available on request. The



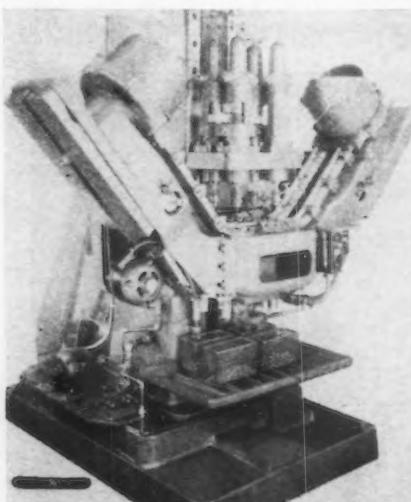
NEW EQUIPMENT

capacity of the drill press which will drill to the center of a 13 in. circle is $\frac{1}{2}$ in. The wheel dresser is adjustable from 20 to 100 deg.



Automatic Tapping Machine

A THREE-SPINDLE automatic tapping machine, the Tapmaster, has been developed by *D. H. Prutton Machinery & Tool Co.*, 5295 West 130th Street, Cleveland 11. The machine is composed of three independent units any one of which can tap any size thread up to 1 in. simultaneously. Either single or continuous cycle is provided. Pressing the black button causes the spindle to travel all the way to the top and reverse. Pressing the same button and turning it causes the cycle to be repeated again and again. A lead screw and nut insure positive feed without tearing of threads. The machine has three motors, each 2 hp., a.c. Coolant tank capacities are 5 gal. each.



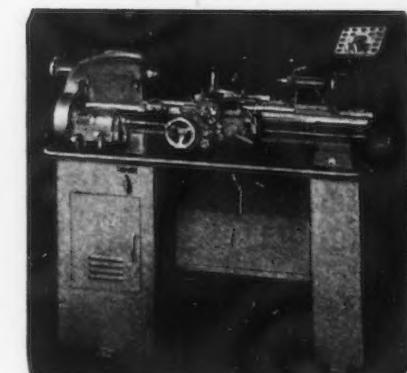
Nut Tapping Machine

AN automatic nut tapping machine for Class 3, 4 and 5 threads has been developed by *Bodine Corp.*, 517

Mountain Grove Street, Bridgeport, Conn. Known as the Bodine No. 48, the machine delivers four nuts simultaneously to four tapping machines by means of two hopper feeding mechanisms each equipped with two adjustable chutes. All four spindles are lead screw controlled and operated simultaneously by one segmental gear drive which starts taps at slow speed and then reverses at double the tapping speed. The threads on the master screw and its spring-tensioned nut match those of the tap and hence both are changed when the tap pitch is changed. Four precision-tapped nuts are produced per stroke. If commercial threads (Classes 1 and 2) are to be tapped lead control spindles are not required.

Metal Cutting Saw

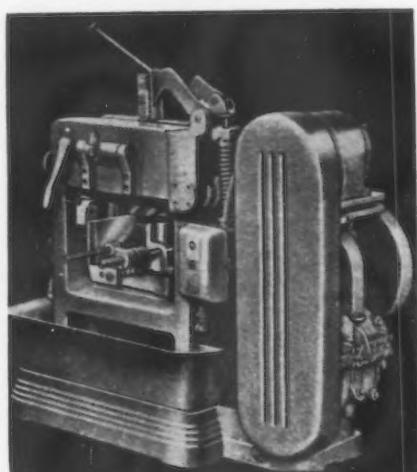
A MECHANICALLY driven metal cutting saw, the Mechanic-Cut, having four-sided saw-frame performance and finger-tip control of pressure has been announced by *Peerless Machine Co.*, 1600 Junction Avenue, Ra-



range from 41 to 1270 r.p.m. with back-gear drive for the lower speeds. A quick-change gear box permits cutting 48 pitches of screw threads, 4 to 224 per in., and provides 48 power longitudinal feeds and power cross feeds. The lathe is equipped with a handwheel draw-in collet attachment, collet rack, taper attachment, thread dial indicator, thread cutting stop, large and small faceplates and micrometer carriage stop. Additional attachments are available.

Light Turret Lathe

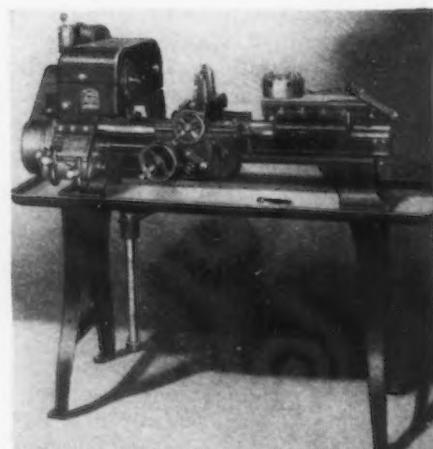
DESIGNED to handle bar stock up to and including $\frac{5}{8}$ in. in diameter, the Logan No. 840 quick-change gear turret lathe has been developed by *Logan Engineering Co.*, 4901 West Lawrence Avenue, Chicago 30. Features of the machine include precision preloaded ball bearing spindle mounting, adjustable gibbs to compensate for wear of turret and cross slide and self-lubricating bronze bearings. The gear box provides 48 threads and feeds in either direction to the carriage. Screw threads of from 8 to 224 per in. are available, and by changing the stud gear, additional



cine, Wis. The saw is available in capacities of 7 x 7 in., 11 x 11 in., and 14 x 14 in. The saw features a compensating feed unit. A massive four-sided saw frame surrounds the blade and the work and permits locating bearings above and below the saw blade. Hardened and ground renewable inserts take all the strain and wear as the saw frame reciprocates. The backing plate is locked 1/32 in. above the saw blade.

9 In. Toolroom Lathe

A 9-IN. toolroom lathe has been announced by the *South Bend Lathe Works*, 421 East Madison Street, South Bend 22, Ind. The lathe has a 9 1/4-in. swing and takes 22 in. between centers. It has a maximum collet capacity of $\frac{1}{2}$ in. and a $\frac{3}{4}$ -in. spindle bore. The 12 spindle speeds



threads of 4 to 7 per in. can be had. An automatic apron operates from a spline in the lead screw through a worm drive friction clutch for both longitudinal and cross feeds.

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and Replaceable Pads

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The illustrations graphically show the material saved when a HARDINGE Style "B" Master Feed Finger and interchangeable Pads are used instead of conventional solid feed fingers.

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This saving is apparent to you. The many other advantages of using HARDINGE Style "B" Master Feed Fingers with either steel, bronze or nickel cast iron pads will be immediately appreciated when you put them into use. Learn these advantages by asking for your copy of the bulletin illustrated below.

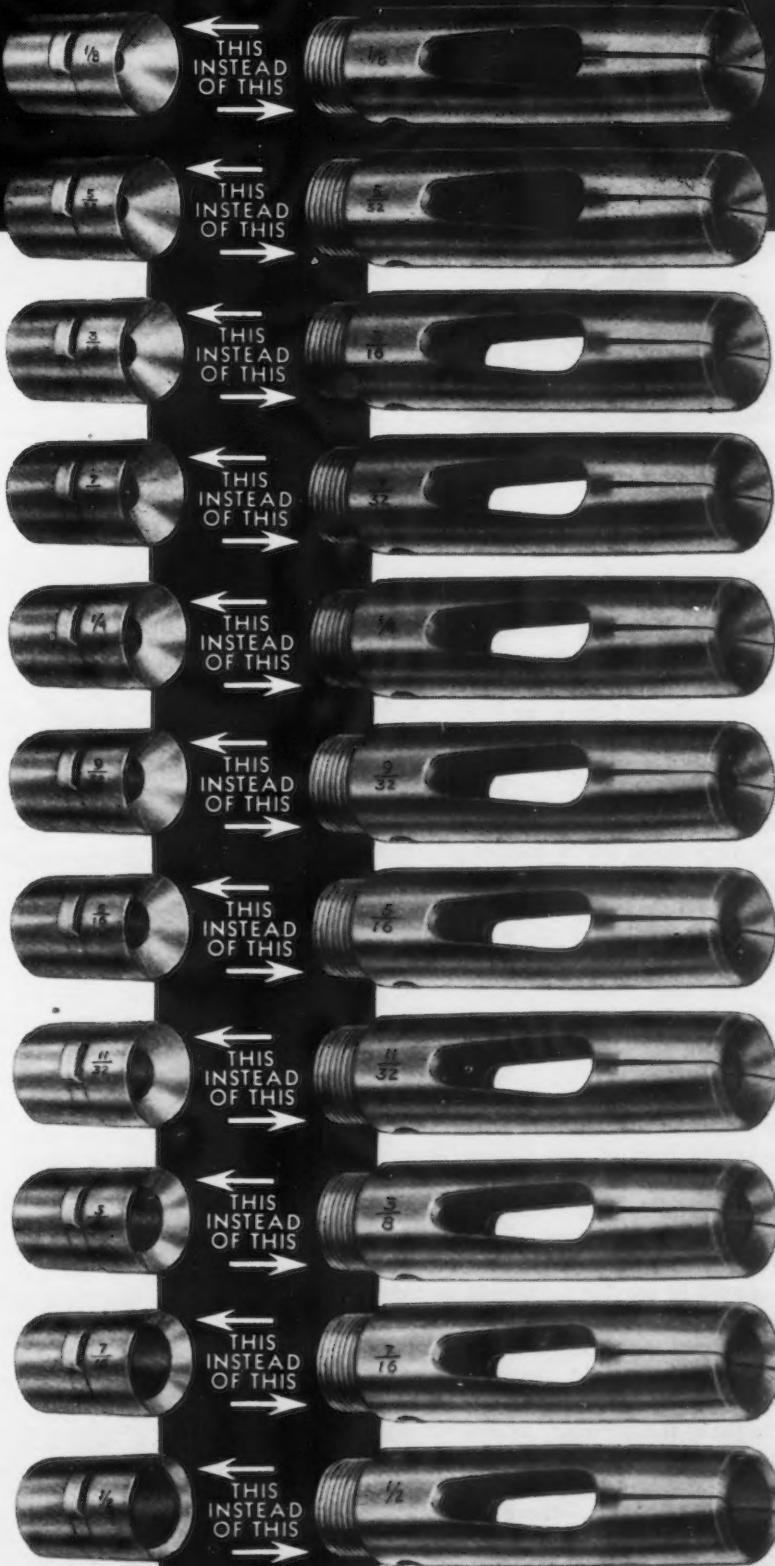
ASK FOR THIS BULLETIN

Every screw machine department should have the complete information given in this bulletin. Available to purchasing agents, superintendents, foremen, engineers, set-up men and operators in organizations which have a screw machine department.



HARDINGE BROTHERS, Inc.
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Assembly Line . . .

STANLEY H. BRAMS

• Bus builders face rosy future as wartime production is loosened and postwar possibilities look up . . . New models to be larger with increased passenger comfort.



DETROIT—Ask a bus builder about the future and watch a pleased smile wrinkle his features. The bus builders are feeling good about their prospects, both for the immediate future and for the long pull ahead.

Bus builders got their foot in the transit business door after the last war, but were unable to swing the door very wide for a matter of ten or twelve years. Then, in the early thirties, cities began to depend less on trolleys, replacing them with motor coaches. The trolley lines were removed, and statistics show today that only five major cities in the United States depend exclusively on trains.

In contrast to this figure, there are now over 50,000 coaches in service. The bright part of this picture, from the standpoint of the bus manufacturers, is the fact that the buses, although built for much shorter life have been used for years and years. Some still in service today are as old as 20 years and are still running.

The usual age for obsolescence in the bus field is eight years, or was, by prewar standards. On this basis there are today over 20,000 overage buses, representing future business for the builders. By even conservative estimates, there are an estimated 10,000 buses now in use in cities and inter-city travel which are worthy only of the junk heap in any peacetime economy.

In addition to this backlog of bus

business brought about by unplaced depreciation, there is a normal obsolescence in the field of about 5000 units per year that must also be taken into account.

In recognition of the need to keep the system of motor bus travel in operation, production of a total of 11,500 buses has been authorized for 1945. It can be recognized that this production will be sufficient only to meet most critical needs when the average prewar production of 17,000 per year is considered. This average for the years 1935 until the war was topped with the peak year '39 when 18,655 coaches were built.

To add to the total business backlog brought about by the war, there is prospect of still greater growth of the bus business as soon as equipment is available. This has been true in the years before the war began, in both the in city and between city services. In the revenue classes (city and intercity) the increase from 1935 to 1941 amounted to 12,500 coaches, and in the non-revenue class (school, hotel, and industrial) increased 25,000 units in the same period.

The return to substantial bus production at the present time will deprive the steel industry of a lucrative business in sheets, as the aluminum material introduced before the war is now available for prompter delivery than is the steel. The weight saving feature of the use of aluminum sheets is of great importance to the cost-conscious bus operators, and tends to strengthen the hold of the light metal on this field. The Greyhound Lines, largest user of inter-city buses, is directly responsible for new developments that are being worked on experimentally in the motor coach field, notably the pilot model being built by Consolidated-Vultee, wartime producer of combat and transport aircraft. To utilize an aircooled engine, the "Liberator" bus is the first of a projected extensive line of peacetime goods planned for sale as a part of the Liberator line. The name is lifted from the official Army Air Forces name of the B-24 heavy bomber, designed by the same firm and mass produced by several manufacturers, including Ford at Willow Run.

Also under development to Greyhound's specifications is a pilot bus of a new design at General Motors' Truck and Coach Division. These coaches will set a record for size,

reflecting the postwar trend for coaches of larger passenger carrying capacity. Greyhound's specifications call for a bus to seat 50 passengers on a two-deck plan.

Also reflecting the trend toward larger coaches will be the new city bus models. It is expected that 60 per cent of the city buses will be of 40-passenger size or over, and that there will be a general change from present standard overall widths of 96 in. to a new 104-in. size.

To compensate for the general trend of business in favor of larger models, builders feel that small buses will recoup their lost ground with the establishment of new feeder lines. These lines would use buses ranging in size down to something slightly larger than a station wagon to haul passengers economically where main lines can ill afford to travel, and will feed to the main lines.

In the power plant field before the war there was a broad program of Dieselization going on in Greyhound's stock, at the expense of Ottocycle power, and it is expected that this trend will continue when the equipment becomes available. In the city lines, several operators were having success with the use of Diesel-electric units, and will expand their use after the war. The possibility that the use of high-octane fuels may render the Diesel, using fuel oil, uneconomical is being carefully considered, although present information indicates that the Diesel will retain its importance. It is also known that one manufacturer is considering the use of a steam powered unit, and the above mentioned air-cooled Consolidated unit is also of interest.

For its postwar plans the Twin Coach Co. will use a two-engine bus, with one engine geared to each of the rear wheels. Most 1945 buses will have automatic transmission in 1945, and it will be universal thereafter. The General Motors Coach has its hydraulic drive, and a torque converter will follow the White, Mack, and Twin soon after.

Interest in air conditioning has widened considerably among the builders, and there appears to be a general need for some type of heater that can be used for conditioning in summer. There is also a trend toward the use of ornamental fittings, indicating that the makers of these items should find a wide market among the bus builders.

This use of ornaments is a part of

HOW TO CUT THREADS IN THE NEW

AGE

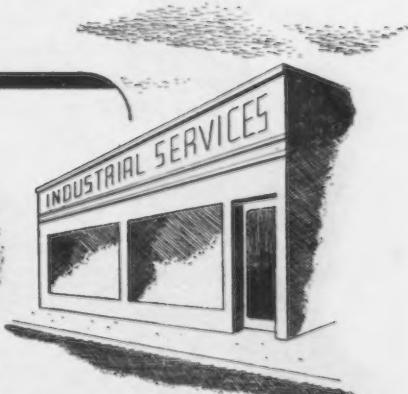
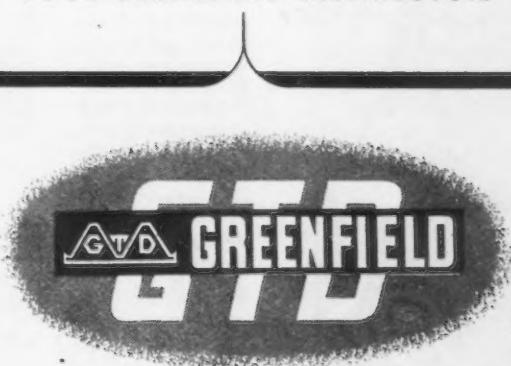
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Rubber
Aluminum
Plastic
Magnesium

ARE YOU PLANNING TO USE NEW MATERIALS AFTER THE WAR?

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ON THE ASSEMBLY LINE

an overall trend toward increasing attention to pleasing the passenger's eye, and making him as comfortable as possible. There is also likely to be a move toward the use of the dual front wheel now under development in Detroit.

See THE IRON AGE, Nov. 2, 1944, page 76.

Among the manufacturers, the General Motors Truck and Coach Division is by far the largest, with Mack and White running neck and

neck for second place. Twin Coach and Ford are the other two firms in the "big five" of coach production. The remainder of the market is largely broken up among the non-integrated bus builders. That is, they purchase the chassis from some standard builder of trucks, and then build the coach body over it. As a general rule they capture a profitable portion of the trade in the particular area where they are located, but seldom operate outside this area.

Material Handling Men Form New Super Trade Association

• • • The formation of The Material Handling Institute was announced today by Lawrence J. Kline of The Mercury Manufacturing Company, Chicago, who has been elected to serve as the first President of the organization. Mr. J. Faulkner Thomas of the Thomas Truck & Caster Company, Keokuk, Iowa, was elected Vice-President of the Institute. Walter S. McCann, who has had long experience in trade association work, will serve as Acting Secretary-Treasurer.

Directors elected were: S. K. Towsen of The Elwell-Parker Electric

Company, Cleveland, Ohio; Lester M. Sears of The Towmotor Corporation, Cleveland, Ohio; Walter C. Stuebing of Lift Trucks, Inc., Cincinnati, Ohio; M. W. Heinritz of the Philco Corporation, Storage Battery Division, Trenton, N. J.; H. A. Carter of Geneva Metal Wheel Company, Geneva, Ohio; and L. C. Backart of The Rapid Standard Company, Grand Rapids, Mich.

Interest in material handling in industry and distribution has mounted steadily since the start of the war. The wheeled industrial transportation equipment industry, which during 1943

had sales in excess of \$300,000,000 has made substantial contributions to the war effort in connection with the production and distribution of the mountains of supplies and equipment required on the fighting front. There are about 165 concerns with a major interest in the industry. Among those which have already affiliated with the Institute are:

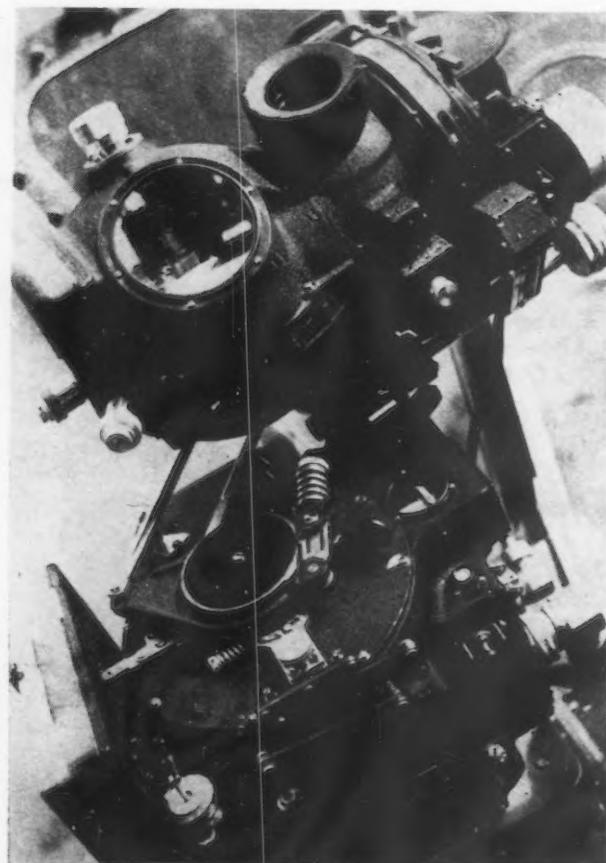
Automatic Transportation Company
The Baker-Raulang Company
Crescent Truck Company
Divine Brothers Company
Domestic Industries, Inc.
Economy Engineering Company
Thomas A. Edison, Inc.
Electric Products Company
Electric Wheel Company
Elwell-Parker Electric Company
Fate-Root-Heath Company
Faultless Caster Corporation
Geneva Metal Wheel Company
W. F. Hebard & Company
Hertner Electric Company
Lewis-Shepard Company
Lift Trucks, Inc.
Mechanical Handling Systems, Inc.
Mercer Engineering Works, Inc.
Mercury Manufacturing Company
Nutting Truck & Caster Company
Pallet Sales Company
Philco Corporation
Rapid-Standard Company, Inc.
The Ready-Power Company
Ross Carrier Company
Saginaw Products Corporation
Silent Hoist & Crane Company
Sterling Lumber & Supply Company
Thomas Truck & Caster Company
Towmotor Corporation
Vaughan Motor Company
Yardman, Inc.
Yale & Towne Mfg. Company

The new organization, which is virtually a confederation of trade associations in this field, is a non-profit organization designed to serve as a medium for the exchange of facts and information relating to industrial material handling and the activities of manufacturers in that field. It is proposed that application will be made for a corporate charter.

Membership will be of three classes—an active membership group, comprised of manufacturers whose major interest is in this particular field; an associate membership group composed of manufacturers with a secondary interest in the field; and a fellow membership group, consisting of individuals interested in material handling.

In announcing the formation of the new Institute, President Kline called attention to the growing interest in material handling and its present and future importance in the nation's economy.

Temporarily the Institute will have headquarters at 208 South LaSalle Street, Chicago 4, Ill.



BOMBSIGHT :
The Northern bombsight pictured above is the long secret American aerial weapon. The lower half is usually permanently installed in the plane and is the stabilizer, containing horizontal gyroscope maintaining azimuth control. The vertical gyroscope which stabilizes the telescope is in the upper half, as is the range-computing apparatus (right).

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Washington . . .

L. W. MOFFETT

- Smaller War Plants Corporation soon to join the agencies already flirting with surplus property disposal
- Investigation of SWPC surplus property powers seen possible.



WAshington—Under the provisions of the Surplus Property Act interested buyers of government surpluses will soon have the Smaller War Plants Corporation to contend with. Maury Maverick, SWPC chairman, is awaiting the promulgation of rules and regulations by the Surplus Property Board, which will add the 107 regional and district offices of SWPC to the 75 offices of the Treasury, RFC, Maritime Commission, WFA, Army and Navy to the rapidly mounting confusion that attends the sale of surplus goods. SWPC's mission is to prevent "discrimination" against small business in the disposal of surpluses.

However, the powers given to SWPC under the Surplus Property Act are so broad that certain legislative circles, which originally supported the legislation supporting SWPC, are beginning to wonder what they have created. Since renewal legislation for SWPC will be necessary before next July a thorough investigation of the powers given to SWPC in the disposal of surpluses is being talked about in connection with any hearings that are held on the new legislation.

The Surplus Property Act states that rules and regulations, under the Act, cannot be put into effect until at least two members of the three-man Surplus Property Board have qualified for such positions. Therefore, the confirmation of Presidential appointees, ex-Governor Robert Hurley of Connecticut, and Lieut. Col. Edwin Heller, as members of the Board several weeks ago, was all that

was necessary to start SWPC along the way as another of the agencies connected with the surplus disposal problem.

Although there was considerable criticism of these two nominees from some quarters, and the Senate vote which confirmed them was along strictly party lines SWPC was silently behind both nominations. Chairman Maverick was particularly pleased with the confirmation of ex-Governor Hurley. The other member of the Board, expected to be appointed after the new Congress convenes, is to be ex-Senator Guy Gillette, Democrat, Iowa.

THE Act, which gives the two new appointees their power, has been declared unworkable by the former head of the now defunct Surplus War Property Administration, Will Clayton. The passage of the Act was the cause of Mr. Clayton's resignation. The conflicting priorities which were set up in this piece of legislation and the provision which prohibits men who have been connected with the disposal of surpluses from taking a position with any firm interested in surplus property for a period of two years after government service has ended have also led to the resignations of many key men in the Treasury Surplus Unit, which has been charged with the disposal of surplus consumer goods. Included in this group were E. L. Olrich, who directed the Treasury's job in surplus disposal, and many of his top aides.

But Mr. Maverick, speaking before a Senate committee on Dec. 14 said, "I regard this law as a masterly piece of legislation." The portion of the law which particularly pleased him is Section 18, the small business section.

This section requires the Surplus Property Board to devise ways and means and to formulate regulations to prevent discrimination against small business. Thus far, such discrimination has not been defined, which ostensibly gives SWPC power to make such a definition. The Board is also required to determine the areas and the sizes of the lots of the various classes and types of merchandise to be sold.

SWPC is given authority to purchase surpluses for re-sale to small businesses and is authorized to make or guarantee loans to small businesses to acquire and operate surplus plants and to cooperate with disposal agencies to sell to small business on credit. SWPC is well-heeled for these purposes. Capitalization of the agency has just been increased \$200,000,000. In addition, the skids are being greased for early passage of a bill which would make SWPC a permanent peacetime agency with a capital fund of \$1,000,000,000.

These provisions leave a number of unanswered questions. For example, how far will SWPC go in extending credit, how much of the existing capital will be used to buy surpluses for re-sale, how long will SWPC be able to hold surpluses that are purchased for re-sale? Loose interpretation of the Act would seem to give the agency the power to withhold surpluses if disposal methods of the designated disposal agencies did not parallel Mr. Maverick's thinking.

SWPC has already differed with the disposal agencies on methods of sale. Mr. Maverick and his staff have openly criticized Mr. Olrich and the Treasury Office of Surplus Property for instituting a sales method whereby surpluses are first offered to the original manufacturer or to a manufacturer making similar products. Treasury believes that the best possible distribution can be achieved by offering surplus consumer goods to manufacturers before making them available to either the wholesale or retail trade.

In regard to Mr. Maverick's hostility to Mr. Olrich, the SWPC Chairman told a Senate committee on Dec. 14 that, "With regard to the Treasury, I want to say that Smaller War Plants is on the best of terms with that agency. I might not have been able to say this, so far as disposals are concerned, a few weeks ago." Mr. Olrich's resignation became effective Nov. 20.

SWPC contends that sales made to manufacturers are wrong because:

- 1—Such sales result in the lowest possible price to the government.
- 2—Sales make in this manner re-

DOES A *Good Turn* ON 1045 STEEL

SUNOCO EMULSIFYING CUTTING OIL

helps rough turn $18\frac{5}{8}$ " spindle head at 265 S.F.P.M.

A good rule when you want a good turn is to use the right cutting oil. That's why so many leading metalworking shops rely on Sunoco Emulsifying Cutting Oil for all operations where a soluble oil can be used.

Just one example is the operation shown, where a large machine tool manufacturer uses a 20 to 1 mixture for rough turning the head end of a large spindle made of S.A.E. 1045 steel. Sunoco meets all requirements of tool life, tolerance, finish and speed. Sunoco's advantages can be applied shopwide, too . . . not only on turning operations, but for milling, boring, drilling, hobbing, slotting, grinding, etc. The high heat-absorbing and lubricating properties of Sunoco Emulsifying Cutting Oil aid in the prevention of overheating and drawing of the temper at the cutting edge. Chips do not seize . . . tools cut cleanly, evenly, at high surface speeds.

In the reconversion period, just as during peak war production, metalworking plants will depend on Sunoco to give them maximum machining efficiency . . . with utmost economy. Now is the time to consider Sunoco Emulsifying Cutting Oil for your plant. Get the recommendations of a Sun Cutting Oil Engineer. Write . . .

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

PERFORMANCE DATA

OPERATION—Turn head end of spindle

MACHINE—Bullard 36" Vertical Turret Lathe

MATERIAL—S.A.E. 1045 Steel Forging

ROUGH TURN— $18\frac{5}{8}$ " diameter

SPINDLE SPEED—54 R.P.M.

CUTTING SPEED—265 S.F.P.M.

FEED—.018"

DEPTH OF CUT— $5/16$ "

CUTTING LUBRICANT—1 part Sunoco to 20 parts water



SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

sult in double profits to the manufacturer.

3—Merchandise will be withheld by manufacturers to maintain price structures.

4—Such sales are a threat to full employment, because manufacturers will not enter into full production if their warehouses are filled with surplus goods when the war is over.

SWPC economists in preparing this statement apparently ignored all normal business practices. The fact that certain merchandise that has been sold to manufacturers was in need of re-working before it could be sold for consumer use was also overlooked. In addition, of the many millions of items that will become surplus there are many that can only be effectively distributed through channels that have been set up by the original manufacturer of the product.

Along with his opposition to many of the policies that have already been put into effect, under the old SWPA, the former Texas Congressman is going to insist upon strict observance of the requirements of the Act as they apply to SWPC.

Mr. Maverick has ambitious plans and will brook no opposition. SWPC would like to use machine tools and other capital goods, which are in the province of RFC, to renovate all of

the small manufacturing plants in the country. Such equipment would either be leased or sold outright.

SWPC has conducted a survey of small plants in the Detroit area to determine what interest there is in surplus machine tools. Attempts were made to find out what types of tools were needed and how they could be financed. Mr. Maverick and his staff believe that the results obtained in this survey are sufficient to warrant a more extensive check.

What this all adds up to is this, SWPC will be getting its foot in the door of practically all surplus disposals once its regulations are issued, unless some of these broad powers are limited by Congress.

It is perhaps significant that the President did not designate SWPC as a disposal agency, when the Surplus War Property Administration was set up, yet under the Surplus Property Act SWPC is a kind of hybrid middleman, half owning agency and half disposal agency.

Improvement Urged In Placement of Railroad Car Orders for 1945

Washington

• • • Production of railroad cars in 1945 can be improved over the current output if claimant agencies and the railroads place orders properly spaced and far enough in advance to permit continuous production, WPB has been informed by the Railroad Car Builders' Advisory Committee.

Brig. Gen. C. D. Young, ODT deputy director, told the committee that the industry may be ordered to concentrate on building box cars during the third quarter of next year. Officials of the WPB said that a very

small number of passenger cars will be built for domestic railroad use in 1945 because of the present manpower situation.

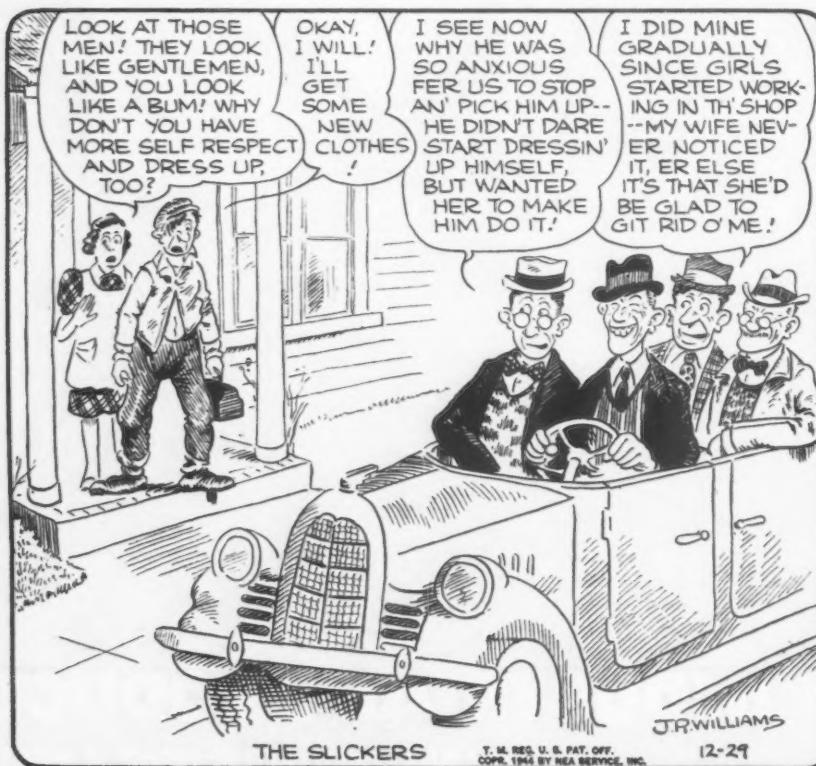
The plan for production next year was outlined after WPB officials announced that a decision on a new over-all policy sets a ceiling for future non-military production based on 1944 fourth quarter production. Any cutbacks in military requirements could be absorbed by non-military production only after a special survey of the manpower in a labor area, it was stated.

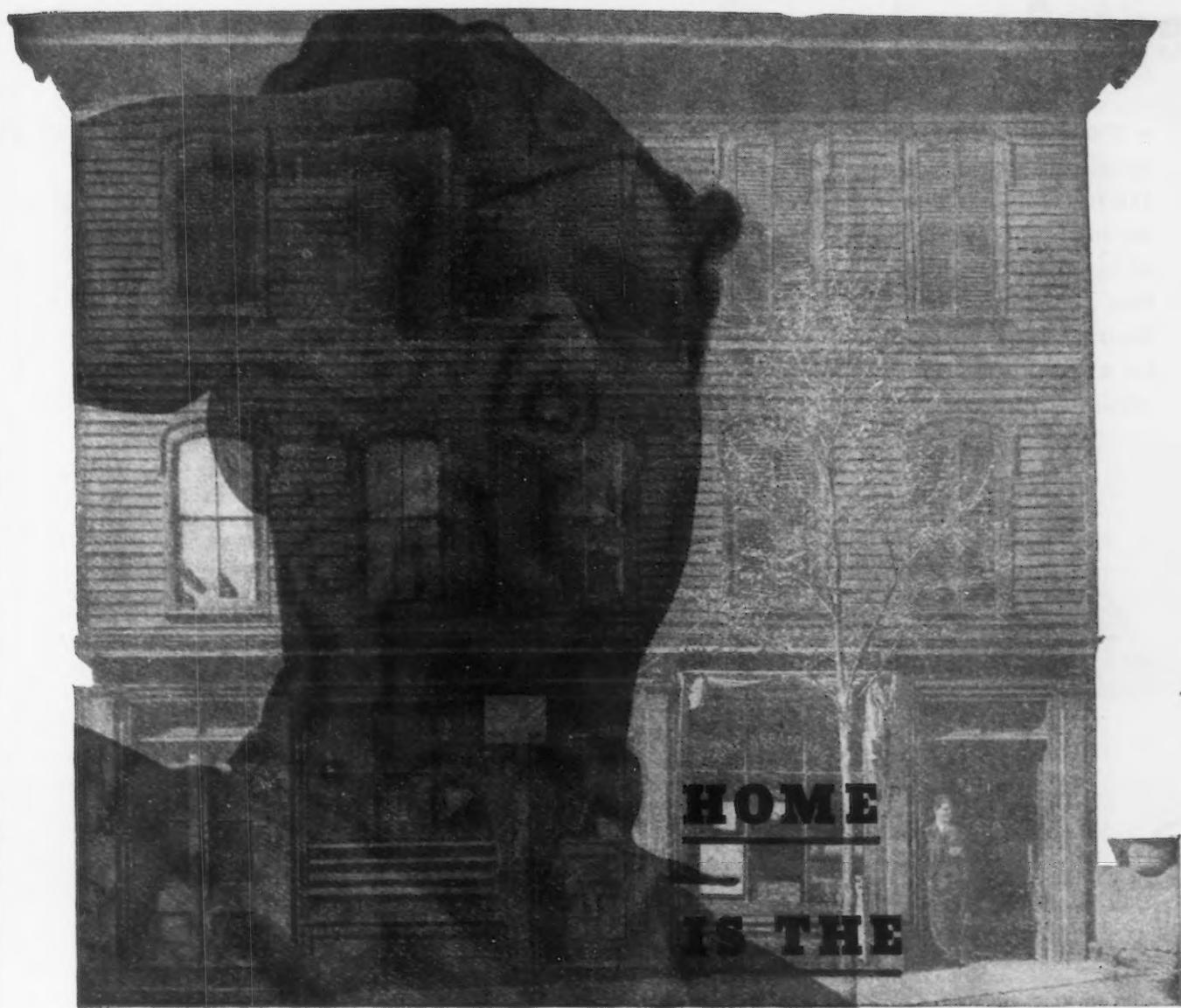
WPB officials reported production for the first 11 months of 1944 amounted to approximately 5800 freight cars a month with contract shops averaging 4600 cars and railroad shops 1200. However, production during the last three months of 1944 dropped somewhat, WPB said. This gain on the part of railroad shops was said to be probably due to continuity of work there. Under the quota system railroad shops have produced about 16 per cent of the total car production during the past two years, WPB said, as compared with a previous estimated average of from 12 to 14 per cent.

WPB told committee members that, where increased production is involved, a Form WPB-3820 covering manpower data must be filed in conjunction with the CMP-4-B applications for material allotments. This form, WPB explained, should reflect the number of additional production workers, if any, required to produce additional freight cars. No increase in production may be authorized by WPB, it was pointed out, until a favorable recommendation for such increase has been made by the area WMC office or the area Production Urgency Committee. Railroad car builders are required to file separately for the production of new cars and the production of car parts, WPB said.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





HERO ★★

Soon he'll be home from the wars—triumphantly home . . . to what?

The cold facts are these:

Nearly one-third of our fighting men are returning to "homes" that are without running water . . . 35 per cent of the dwelling units in this country are without sanitary plumbing or bathing facilities of any kind . . . and American slums have bred the highest rate of juvenile crime in our history.

In short, there's still a war to be won here at home!

Our weapons are the mightiest on earth. Our manufacturing productivity is equal to half the world's total capacity . . . our basic economy and our currency

are sound . . . and our faith in the American Ideal is stronger than ever before.

The time to start fighting that war is now. Delay could mean defeat, and the loss of all that our sons have fought and died for. Victory will mean a great new age of peace and prosperity, with jobs and security for all.

The engineers of the basic machine tool producers can help the men of government and of industry to win that victory . . . to plan now the reconversion of our tremendous wealth of resources, skills and machinery to all-out production for a better America.

One of these engineers is a Bryant man. We urge you to call him in today.



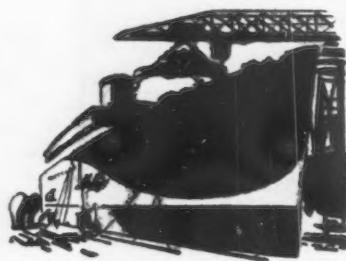
BRYANT CHUCKING GRINDER COMPANY

SPRINGFIELD
VERMONT, U.S.A.

West Coast .

OSGOOD MURDOCK

- Welders draw local spotlight in their traditional wandering through the wilderness of jurisdictional difficulties . . . Machinists try their Lodge President for overzealous communistic leanings.



SEATTLE—Welders have held the headlines quite consistently in the local press this past month and the end is not yet in sight. On Dec. 22 a strike vote was taken at Todd-Pacific Shipyards under NLRB and it will presumably settle a dispute of long standing, primarily over jurisdiction, between AFL Boilermakers Local No. 104 and Welders Local No. 541. Both are affiliated with the Seattle Metal Trades Council, on the one hand, and an independent welders' union, Local No. 9 of the United Brotherhood of Welders, Cutters and Helpers.

On Dec. 2, under the provisions of the Smith-Connally Act, a first round strike vote was taken, and the workers voted 3,833 to 2,864 not to strike. With this verdict the independent group was dissatisfied and threatened a walkout the following week, but reconsidered and postponed direct action until after the date of the second vote.

Henry A. Doty is national representative of the independent union which claims to represent from 600 to 700 members in Seattle. It is his claim on behalf of his members that "enforced loafing" results from jurisdictional prohibitions between boilermakers, blacksmiths, machinists, steamfitters, electricians, sheet metal workers and other trades within the Metal Trades Council now operating within the shipyards. The issue ap-

parently is not higher wages, but the right of welders to handle their work system without outside union interference and time wasted. Mr. Doty undoubtedly has a little something there as any hull superintendent, yard boss or industrial relations supervisor would sadly agree from experience.

On its part the Seattle Metal Trades Council issued a well prepared public statement in a paid advertisement which traced the long and complex history of welders' wanderings in jurisdictional wilderness ever since the hallowed Wilson Award by the U. S. Department of Labor in 1918 said that the process of welding, both acetylene and electric, belonged to the respective trades under whose jurisdiction the work was being performed.

With the passing of time most welders have been affiliated with the boilermakers, but in Seattle in 1937 by mutual consent and with complete understanding a separate welders' charter was granted by the International Brotherhood of Boilermakers to Welders Local No. 541 into which anyone who followed welding exclusively as a livelihood was compelled to transfer his membership.

Says the statement: "Ever since the freezing of wages by the President of the United States on Oct. 2, 1942, the Seattle Metal Trades Council has fought hard and consistently for the breaking of wage freezing and for anything no matter how small, that would benefit the workers the Seattle Metal Trades and their affiliated unions represent as their bargaining agent."

This significant statement perhaps summarizes the case for the Metal Trades Council and is a plea for loyalty and noninterference with its jurisdiction over welding workers. The statement further accuses the independent group of "damnable lies" preceding the jurisdictional election on Dec. 2 and of interfering with war production. "The people who want to represent you are not only unreliable but cannot be relied upon for a pe-

riod of 24 hr. . . . Production must not, cannot and will not cease. The armed forces are depending on you!"

AF'L is strong and well directed around Puget Sound and the chance for an independent group to break in is dim. Mr. Dave Beck, local proconsul and active head of the teamsters is a big business man who now cooperates with other big business men in labor and management. Heavy industry and metal working is predominantly AFL.

Following a recent "wildcat" taxi-cab strike, 12 ringleaders in the cab drivers union were tried formally before their fellow unionists for disloyalty, abuse of constituted officers, disobedience, breach of contract and inciting an insurgent movement.

A close second to welders in the internecine strife within the ranks of labor have always come the machinists, and Seattle's Hope Lodge No. 79, IAM, AFL, has recently been split into two almost equal camps over the issue of communism. The Local is reported to have about 8000 members and its president, Glen G. Kinney, has been on trial before his fellow unionists on charges of engaging in communist activities. One of his lieutenants and supporters is Hugh De Lacy, recent Democratic candidate for Congress. For the formal trial International President H. W. Brown sent Vice-President George C. Castleton to Seattle as observer and mediator. Old timers, almost numerically an even half of the total membership, have been especially resentful of De Lacy's activities as chairman of the lodge's political welfare committee.

KAISER SHIPYARDS in the Portland area are returning to the six-day week after 15 weeks on the seven-day shift installed to speed up production of attack transports. Yard officials state that the Sunday work produced enough additional man hours to build five or six extra ships.

A. F. Hardy, Washington State

worthwhile
savings...



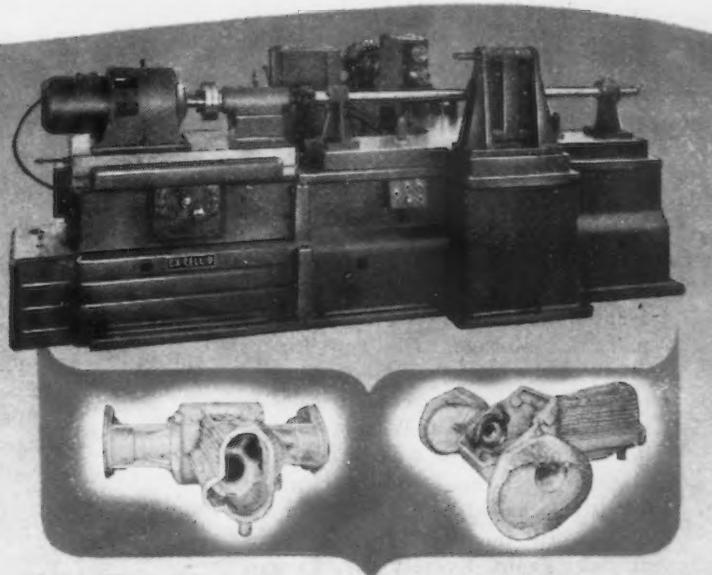
that EX-CELL-O's pioneering in Precision machining now makes possible to you!

TO MAKE sure of a low "unit cost" on high production jobs you're planning for tomorrow, you should get in touch with Ex-Cell-O today. For many years Ex-Cell-O has been foremost in the designing and construction of special multi-purpose and semi-standard machines for America's leading industries, both small and large. A quarter of a century of *precision engineering* has gone into Ex-Cell-O experience. This "know how" has made the Ex-Cell-O name well and favorably known throughout the industrial world. The advantages of this practical background are available to you now, when the pressure of post-war competition is fast approaching. In making your production plans for the immediate future, give early consideration to Ex-Cell-O multi-purpose machines. They frequently perform numerous operations in one setting of the work and often bring a substantial increase in the number of parts hourly produced, also improved quality and lower unit cost.

EX-CELL-O CORPORATION • DETROIT 6



Above: Bulletin on Ex-Cell-O Precision Way Machines For Higher Production and Improved Accuracy. Write for free Ex-Cell-O Bulletin 31631.



Above: Ex-Cell-O Special Style 58 Two-Way Machine for finish boring center and both ends of differential transmission case (of chrome nickel iron—shown in two views). This Ex-Cell-O machine combined several operations formerly necessary, and greatly increased production.

Below: Ex-Cell-O method of bolted construction. Linked in this manner are the wing sections of the machine that carry the spindles, and the center section that carries the work fixture. This Ex-Cell-O feature of construction provides not only added strength and rigidity but greater flexibility. When desired to machine a part of different dimensions the center section can easily be removed and a section of different size substituted.



Where increased production, high accuracy, and greater economy through multiple operations are required...consult EX-CELL-O.

EX-CELL-O makes:

SPECIAL MULTIPLE WAY-TYPE PRECISION BORING MACHINES

SPECIAL MULTIPLE PRECISION DRILLING MACHINES

PRECISION BORING, TURNING AND FACING MACHINES, AND FIXTURES

PRECISION CYLINDER BORING MACHINES

PRECISION THREAD GRINDING MACHINES

PRECISION LAPING MACHINES

PRECISION BROACH SHARPENING MACHINES

OTHER SPECIAL PURPOSE MACHINES

BROACHES AND BROACH FIXTURES

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GRINDING SPINDLES
DRILL JIG BUSHINGS

CONTINENTAL CUTTING TOOLS

TOOL GRINDERS

FUEL INJECTION EQUIPMENT

R. R. PINS AND BUSHINGS

PURE-PAK PAPER MILK BOTTLE MACHINES

PRECISION AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

Director of Manpower, has labeled as false and vicious recent charges of a former Puget Sound Navy Yard worker that unfavorable work conditions at Bremerton were responsible for thousands of workers quitting. Mr. Hardy states that Bremerton's turnover is lower than any other yard on the Pacific Coast, 5.7 per cent for last month compared with 9.1 for the whole Puget Sound District. Bremerton is beautifully and scenically situated on the west shore of Puget Sound with the rural, marine forest and alpine attractions and resources of the Olympic Peninsula at its back. But it is almost an hour by ferry from Seattle, with no other city or community near by, and housing and community service have struggled with the difficulty of keeping pace with voracious growth in manpower requirement.

Boeing's plant situation is particularly interesting in its possible effect on postwar operations. The company owns its two big Seattle plants, Nos. 1 and 2, and leases its Plant 3 principally for storage. The new Renton plant, of the blackout type, is Government owned, and is located beside the south end of Lake Washington, as its original purpose was to build sea planes. It is here that B-29's are finally assembled, but its postwar future is still in doubt. Branch plants at Bellingham, Everett (2), Tacoma (2), Aberdeen, Hoquiam and Chehalis are all leased and were located where USES believed latent manpower to be available. Operations are auxiliary sub-assembly jobs for the most part. Boeing now controls 5,973,857 sq. ft. of covered floor space including leased warehouses and would gladly employ some 8000 additional workers to accelerate schedules on the B-29's.

A REALISTIC contribution to thinking on Pacific export possibilities was recently made by Dr. August Maffry of the U. S. Department of Commerce when he pointed out that four-fifths of the West Coast prewar exports were in six industries: Fruits, forest products, wheat, petroleum products, canned fish and a varied lot of chemicals. If these and new industries doubt their ability to compete in domestic markets they can scarcely hope to compete successfully in foreign markets except where cost of transportation is a ruling factor and where the West Coast has a marked advantage in this respect. In prewar years exports

from the West Coast constituted 12 per cent by value of total exports from the United States. If a high level of domestic employment and production can be achieved and maintained after the war, it is estimated that imports into the United States would run to approximately \$6,000,000,000 in terms of 1942 prices. On this basis a \$7,000,000,000 volume of exports would be supported and the normal West Coast share of this would be \$850,000,000. But if exports were increased to a total of \$10,000,000,000 by favorable conditions at home and abroad, the West Coast might expect an export trade between three and four times as large as it was before the war.

Dr. Maffry counselled that every effort be made to develop specialized export products in which labor cost is high relative to material cost, which are distinctive in character and which should be sold on a quality rather than a price basis. Furthermore, seaports and airports should be carefully developed and distribution facilities for imported products consumed in the West Coast area encouraged, so as to provide the necessary balance for export credit, he said.

Cited for Awards

• • • The following companies have received the Army-Navy "E" for outstanding war production:

Bunting Glider Co., Philadelphia.
Commercial Radio-Sound Corp., New York.
Consolidated Vultee Aircraft Corp., Stinson Division, Wayne, Mich.
Eastern Tool & Stamping Co., Saugus, Mass.
General Excavator Co., Marion, Ohio.
General Motors Corp., AC Spark Plug Division, Ionia, Mich.
Goodyear Tire & Rubber Co., Goodyear Clearwater Mill No. 3, Cartersville, Ga.
Lyon Metal Products, Inc., Chicago Heights Plant, Ill.
McNaught Metal Products Co., Inc., Chicago.
I. Miller & Sons, Inc., Fox Chase Knitting Mills, I. Miller Parachute Division, Long Island City, N. Y.
Noblitt Sparks Industries, Inc., Franklin Division, Franklin, Ind.; Greenwood Division, Greenwood, Ind.
Northern Metal Products Co., Chicago.
Pittsburgh Metallurgical Co., Inc., Charleston, S. C.
Progress Mfg. Co., Oil Equipment Division, Arthur, Ill.
Reliable Electric Co., Chicago.
Rowan Cotton Mills Co., Salisbury, N. C.
Sherrill Research Corp., Peru, Ind.
Theew Shovel Co., Lorain, Ohio.
Utility Trailer Mfg. Co., Los Angeles.
Wiedemann Machine Co., Philadelphia.
Wilcolator Co., Elizabeth, N. J.
L. A. Young Spring & Wire Corp., Plant No. 1, Detroit.

Graham War Backlog Promises Still More Production in 1945

Detroit

• • • Joseph W. Frazer, chairman of Graham-Paige Motors Corporation, announced today that his company's backlog of war orders now has reached the point where scheduled production for the next six months exceeds the total volume for the entire year of 1944, when approximately \$50,000,000 in armaments was turned out.

He said the stepped up manufacturing program at the auto concern's plant in Detroit and its subsidiary at Warren, Ohio, includes orders for LVT-3 amphibious tanks, connecting rods for B-29 bombers, portable electric generating plants for the Army Engineer Corps, gears for the Bureau of Ships and Maritime Commission, landing barges, boiler turbine cases and other war materials.

Mr. Frazer explained that his company's accelerated program calls for a doubling of production of "alligators" — the amphibian tank. Plant facilities at Detroit, he explained, have been expanded and work on new assembly lines is approaching completion.

Volume production of master connecting rods for the 2200 horsepower B-29 bombers has begun at the Graham-Paige plant, he said, and deliveries are now being made. Although the company has produced more than 850,000 master and connecting rods for other types of aircraft engines, this is its first contract for B-29 parts.

Batcheller Named As WPB Operations Chief

Washington

• • • Appointment of Hiland G. Batcheller as WPB Chief of Operations has been formally announced by WPB Chairman J. A. Krug. Mr. Batcheller will have "authority to handle broad policy questions." In September Mr. Batcheller returned to WPB from the Allegheny-Ludlum Steel Corp. of which he is president to take the post of operations vice-chairman.

Mr. Batcheller has appointed Harold Boeschenstein as operations vice-chairman. Mr. Boeschenstein had been serving as Mr. Batcheller's deputy in the vice-chairman's office.

Industry's New Tool of Multiple Uses

MULTIPRESS



— for Your STRAIGHTENING Jobs!

★ Industry's versatile newcomer—MULTIPRESS—equipped with its standard straightening fixtures, can handle any straightening task within its 4-ton pressure range with speed and precision.

Its ram responds instantly to the slightest movement of the control levers . . . may be brought down rapidly or slowly . . . can be stopped anywhere in its downward travel and the work positioned accurately beneath it. Full pressure may be applied at once or increased gradually. Ram pressure limits may be easily and quickly pre-set anywhere between 300 and 8,000 pounds. Ram travel may be limited anywhere between $\frac{1}{16}$ -inch and 6 inches.

Spring mounted gauging rolls, or gauging centers, disengage the work from the V-blocks for easy checking. The precision gauge on the straightening fixture checks shaft deflection, while the gauge in the throat

of MULTIPRESS shows pressures exerted in both tons and pounds per square inch. Straightening tools screw into the internally threaded ram, and are available in radius, inverted radius, and flat styles. Adjustable lights—another MULTIPRESS accessory—afford light, without glare, on the exact work area.

Straightening is just one example of the amazingly wide range of production operations to which the basic MULTIPRESS (as shown below) can be quickly adapted. Other accessories include Motor-driven Indexing Tables, Automatic Cycling Action, Vibratory Hydrollic Pressure Ram Action, and others. Only 16 inches wide, 26 inches deep, and 34 inches high, the unit is a completely self-contained, motor-driven, oil-hydraulic machine tool . . . delivered ready to go to work after electrical connections have been made. Write for details!

The Denison Engineering Co., 1158 Dublin Rd., Columbus 16, Ohio



DENISON
EQUIPMENT APPLIED
Hydrollics

PERSONALS

• **T. F. Patton**, general counsel since 1937 and a director the past two years of the Republic Steel Corp., Cleveland, has been made a vice-president of the company.

• **Dr. Zay Jeffries**, technical director of the lamp department, General Electric Co., Schenectady, has been elected vice-president in charge of the newly established chemical department. **M. L. Sloan**, manager of the lamp department, has been elected vice-president and general manager, and **R. H. Luebbe** has been named vice-president and general counsel. **J. E. Hewley** has resigned as vice-president.

• **William L. Stancliffe**, vice-president of American Car & Foundry Co., New York, has retired from active service as head of the sales department. Mr. Stancliffe will remain with the company in a consultative capacity and will continue as a member of its board of directors.

• **Willis T. Cramer** has been appointed assistant director of research of the American Steel & Wire Co., Cleveland, a U. S. Steel subsidiary, succeeding the late Raleigh H. Barnes. Mr. Cramer has been works metallurgist at the company's Cuyahoga Works since 1940 and has been with the wire company since 1929. In 1936 he was made head of the Newburgh physical laboratory and later that year was transferred to the Cuyahoga Works.

WILLIS T. CRAMER, assistant director of research, American Steel & Wire Co.



• **William H. Weimer** has been elected president of the Davis & Thompson Co., Milwaukee. Prior to his election Mr. Weimer was executive vice-president of the firm. His service with the company dates back to its organization in 1911. **G. L. Otto**, chief engineer for the past 12 years, succeeds Mr. Weimer as vice-president.

• **K. L. Herrmann**, with the Navy Department's Bureau of Aeronautics since 1942 has, upon request, been relieved from active duty and will set up a pilot plant and laboratory for the production of cam engines in the Los Angeles area, as soon as materials and manpower become available.

• **Goodrich K. Murphy** has been named district sales manager with offices in New York, for the Edward G. Budd Mfg. Co., Philadelphia.



PAUL R. JOHNSTON, Cleveland district sales manager, Republic Steel Corp.

• **L. R. Boulware** has been appointed to the staff of Charles E. Wilson, president of the General Electric Co., Schenectady, as a consultant on marketing and merchandising. Mr. Boulware also assumes the duties of **N. R. Birge**, retired vice-president in charge of operations of affiliated companies.

• **Robert P. Kenney**, chief of the vinyl resins unit of the WPB chemicals bureau, has been named manager of international service, Chemical Division, B. F. Goodrich Co., Cleveland.

• **J. J. Anderson** has been appointed Eastern district supervisor, Refrigeration Specialties Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, with headquarters in the New York office.



W. E. COLLIER, retired Cleveland district sales manager, Republic Steel Corp.

• **W. E. Collier**, for the past 30 years Cleveland district sales manager for Republic Steel Corp., Cleveland, and its predecessor company, Republic Iron & Steel Co., has retired. **Paul R. Johnston**, former Cincinnati district manager, succeeds Mr. Collier in Cleveland. Mr. Johnston has been associated with Republic since 1923. **Willard Simon**, who has been assistant district sales manager in Cincinnati, succeeds Mr. Johnston.

• **R. L. Hoenstein** has been appointed superintendent of the Mt. Wolf, Pa., plant, Wickwire Spencer Steel Co., New York. Mr. Hoenstein has recently been chief chemist at Mt. Wolf.

• **Allen M. Adams**, formerly with the tank division, Massey-Harris Co., has been appointed director of purchases for the Perfex Corp., Milwaukee.

• **James A. Lee** has been placed in charge of purchasing for all production and non-productive buying for the Nash Motors Division, Nash-Kelvinator Corp., Detroit. **Frank A. Siver** was named as Mr. Lee's assistant. Both men will be located at the Nash plant in Kenosha, Wis.

• **Harry B. Higgins**, president of the Pittsburgh Plate Glass Co., has been elected to the board of directors of the Westinghouse Electric & Mfg. Co., East Pittsburgh.

• **A. J. Peterson** has been appointed district sales manager of the Apex Smelting Co., Chicago.

• **Joseph E. Vaughan** has been appointed distributor for the Crosley Corp., Cincinnati, in Texas and New Mexico.



E. PEERCE LAKE, vice-president and general manager, Warren City Manufacturing Co.

• E. Peerce Lake has been appointed vice-president and general manager of the Warren City Manufacturing division of the Graham-Paige Motors Corp. at Warren, Ohio. A veteran of 18 years with General Motors, Mr. Lake was vice-president and general manager of the Columbia Machinery & Engineering Corp., Hamilton, Ohio, before joining the Graham-Paige organization.

• Merwin T. Farley has been made supervisor of parts depots, Caterpillar Tractor Co., Peoria, Ill. Mr. Farley has been associated with Caterpillar and its predecessor companies since 1914. He has assisted the purchasing department in material procurement since 1942, and last year developed the company's military parts processing program.

• Edmund A. Georgi, formerly manager of technical development, Papermakers Chemical Department, Hercules Powder Co., has joined the Research and Development Department, Pennsylvania Salt Mfg. Co., Philadelphia, as director of the special products division.

• J. Ralph Fritze has been made head of the manufacturing processes section, Conservation Division, Navy Department. Mr. Fritze formerly was materials engineer for the Edison General Electric Appliance Co., Chicago, and previous to his recent appointment served in the WPB Conservation Division.

• George E. Rittenhouse has been appointed sales manager, A. R. Purdy Co., Inc., New York.

• G. Richard Young has been made director of purchases, The Weatherhead Co., Cleveland. Mr. Young comes from Westinghouse, Lima, Ohio, and succeeds Charles T. Craig, recently appointed manager of the company's Chicago sales office.

• Fred T. Kennedy of the Bennett Pumps Division, John Wood Mfg. Co., Muskegon, Mich., has resigned to become general manager of the Blackmer Pump Co., Grand Rapids, Mich. Mr. Kennedy succeeds Nathan J. Harkness, resigned. Mr. Kennedy recently served nine months as a consultant on forges and foundries for the WPB, Washington.

• H. M. McCormack has been appointed assistant general manager of sales, American Can Co., New York. Mr. McCormack has been with the company for 28 years.

• Walter S. Dunker has been appointed assistant treasurer of American Steel & Wire Co., Cleveland, a U. S. Steel Corp. subsidiary. Since joining the company in 1922 he has held various positions, and most recently has been assistant chief accountant of the Cyclone Fence Division, Oakland, Calif.

• Frank Hodson, formerly metallurgist to the Board of Economic Warfare, Washington, has resigned as metallurgical representative on the 1943 United States Technical Mission to Brazil, to become chief technical adviser to the Instituto de Fomento Industrial, Bogota, Colombia.

• R. V. Wilson has been appointed director of customer service of the research department, Continental Can Co., New York, succeeding L. F. Pratt, who has resigned to take a position with Hunt Brothers, Hayward, Calif.

• Howard L. Edsall, formerly advertising manager of the Ajax Metal Co. and affiliates, has been appointed advertising and sales promotion manager, Tube and Equipment Division, Radio Corp. of America, New York.

• Edward E. Helm has been appointed general sales manager of the Reliance Electric & Engineering Co., Cleveland. Mr. Helm joined the company in 1924 and since 1928 has been district sales manager in Philadelphia. Kenneth S. Lord succeeds Mr. Helm as manager of the Philadelphia district. Mr. Lord has been associated with Reliance since 1926, and recently was director of materials allocation in the Purchasing Department.



G. R. MCKENNA, assistant vice-president, Fabricators Steel & Mfg. Corp.

• G. R. McKenna has been made assistant vice-president of Fabricators Steel & Mfg. Corp., New York. Mr. McKenna formerly was associated with American Car & Foundry Co. for 12 years and more recently with the Maritime Commission's Materials Division.

• A. N. Phillips, purchasing agent of the Schwitzer-Cummins Co., Indianapolis, has been elected president of the Purchasing Agents Association of Indianapolis, Inc. Mr. Phillips has been with Schwitzer-Cummins for the past ten years.

• J. E. Thomas has been named manager of cement sales in the Industrial Products Sales Division, B. F. Goodrich Co., Akron.

EDWARD E. HELM, general sales manager, Reliance Electric & Engineering Co.



Fatigue Cracks . . .

BY A. H. DIX

Surprise

• • • We hinted recently that the English could further endear themselves to us by adopting the American practice of typing the letter signer's name below the signature, as most signatures are illegible. An anonymous Englishman scissored the item and returned it to us with a clipping of this signature seen each week at the foot of your favorite family journal's editorial page:

As the owner of the signature is a modest man, a psychiatrist would probably identify his un-Spencerian hand as an attempt to achieve anonymity. This gives us an opportunity to do a bit of apple-polishing, and we shall seize it. The writer of the brilliant editorials to which the above scrawl is appended is J. H. Van Deventer, your favorite family journal's pres. and ed. dir.

Now that the secret is broken, it would be nice if the translation were put in type just below the hieroglyphics, for the benefit of newcomers. But we doubt that anything will be done about it. Editors are funny.

"B.D." Revealed

• • • "B.D." was used in a letter from Miss Alice V. Neil, librarian of GE's research laboratory at Schenectady. We didn't know what the initials stood for and guessed "braying department." Miss Neil sets us straight:

"B.D." stands for "brains department." I never would have made the slighting allusion of "braying department." More power to your magazine.

We might be misunderstood if we wished GE motors and generators more power, so we will content ourselves by wishing Miss Neil and the other members of this page's loyal army of eighteen readers a Happy New Year.

He Never Told Us

• • • We were obtuse in not interpreting "B.D." but still the use of it would be confusing, for every year some four to five thousand newcomers join your favorite family journal's big and more or less happy family, and they could not be expected to figure out the initials without a glossary.

A man who writes an excellent column for *Better Homes and Gardens* designates a member of his family as "the b.w." In the year we read the paper he never told what the initials meant, and as we could not endure the strain we cancelled our subscription.

Sales Retardant

• • • Which reminds us to suggest that George Washington Hill, who heads the American Tobacco Co., put down on his pad a New Year's resolution to give the initials "L.S.—M.F.T." a rest.

For the benefit of our English and Russian readers, we will explain that the initials stand for "Lucky Strike Means Fine Tobacco," a statement that is dinned incessantly into radio listeners' ears. We are not a believer in reticent advertising, but we are not content with the answer, "Mr. Hill is a master salesman, and therefore this type of advertising must sell cigarettes."

Unhindered by the slightest knowledge of cigarette merchandising or radio advertising, our reply is that

even masters make mistakes, and that maybe this type of advertising not only does not sell cigarettes, but may be creating a mass annoyance which will bend the Lucky sales curve south when the public again has a choice. While we are at it we might as well admit that we are also sick of the chant of the auctioneers. We liked it the first five or six times, but like a checked suit the novelty soon wore off.

Ear Torturers

• • • There are those who regard any kind of advertising as good advertising. But obviously this is not so. Offensive advertising is infinitively worse than none, for it cancels the effect of good advertising. A case in point is the advertising of War Bonds by the use of loudspeakers. Sometimes these can be heard two blocks away, and as sound waves seem to fatten as they float upward, little work can be done in nearby office buildings during the uproar. This annoys the unwilling listener to the degree that when the block War Bond salesman calls at his home he buys only one \$100 "E" instead of the two he can afford.

Anchor To Windward

• • • Practising what we preach, we withhold from your gaze even the choicest orchids hurled at us. This is not modesty, but the application of a conviction that the excellence of your favorite family journal is manifest, and that exhibition of the blooms is unnecessary.

But nevertheless we think you should be reminded from time to time that such flowers as these are wasting their fragrance on our file room air:

Your estimable magazine has been affording me very great pleasure . . .

Henry G. Allen, Industrial Engineer,
Oneida Ltd., Oneida, N. Y.

We consider the magazine one of our musts. What other magazine of any description offers the good nourishing meat of your technical articles . . .

H. W. Abbott, Director of Laboratories,
Speer Carbon Co., St. Marys, Pa.

. . . By Any Other Name . . .

. . . In Spartansburg, S. C., is the Muckenfuss Manufacturing Co. Business? Brooms. They're venerable, like The Iron Age—almost a hundred years' worth.

Muckenfuss is a name that grows on you . . .

Bill (Armco) McFee

Cognominally Cursed

• • • If Muckenfuss has reached the century mark it is your favorite family journal's senior by a decade, for next week we celebrate our ninetieth anniversary.

Muckenfuss and brooms are also moderately aptronymic, a blessing few firms receive. Some, in fact, are anaptronymically cursed, as for instance the Hard Manufacturing Co., of Hamilton, which our technical editor, Frank J. Oliver, assures us makes mattresses.

Then there is the holder of U. S. Patent 2,363,055, covering a coating apparatus, who, we are informed by James T. (American Cast Iron Pipe Co.) MacKenzie, is unfortunately named J. Flaws.

A true aptronym is sent in by Robert (Manufacturers Screw Products) Gale: F. P. Woodside is with the Nichols & Cox Lumber Co., Grand Rapids, Mich. Two others are submitted by J. R. (Aluminium Co. of Canada) Charlton: Canada's Director of Weights and Measures is E. O. Way, and Deputy Minister of Fisheries is Dr. D. B. Finn.

A delicate bit of naming is contributed by Frank W. Vanderhoff, of our circulation field staff: The neon sign on a north Jersey tavern reads "Mother's Beer Garden."



THESE TOUGH BITS KEEP THEIR "BITE"
THROUGH *Cyclone* TEMPERING

Bits that bite gleefully into unyielding metal, that spiral chips and curls from quickly drilled holes, must be hard and tough to a precise degree and in an exact ratio.

Lindberg Cyclone Furnaces, like the battery of gas-fired units shown above, speed the production of drills as well as many other tools and parts that require tempering in the fabricating process.

Heating solely by fan-driven hot air from a heat source outside the heating chamber, Lindberg Cyclones build up temperature rapidly and uniformly throughout the entire charge. Corrections and rejections are reduced because distortion is practically eliminated, and hardness tolerances are precisely met.

And the Cyclone is versatile, for all heats from 300° F. to 1250° F., including treat-

ment of non-ferrous alloys. The Throttling Control which automatically adjusts heat input to the requirements of the charge, assures precise and constant temperature control.

Write for full information about these and other Lindberg Heat Treating Furnaces.

LINDBERG ENGINEERING COMPANY
 2452 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

Lindberg 
FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering

CYCLONE for accurate, low-cost tempering and nitriding

HYDRYZING for scale-free and decarb-free hardening

Dear Editor:

MAGAZINES FOR SOLDIERS

Sir:

I noted your item in the Dec. 7 issue on technical magazines for soldiers. Freedom House at 5 West 54th St., New York, is now collecting books for soldiers and is eager to cooperate in handling technical magazines. I deliver to them every week the large accumulation of publications received as a consulting engineer. They are eagerly accepted.

EDWARD W. WEILER
724 Fifth Ave.,
New York 19

MILLIMETER MIXUP

Sir:

The effusion of A. W. Miller in the Dec. 7 issue encourages me to add my two cents worth to the discussion of the relative merits of the metric system vs. our system of weights and measures. I suspect that Mr. Miller is one of those fortunate ones who has never burned the midnight oil over the drawing board or estimate desk getting out facts and figures against time. I think only those knights of the T-square who have used both systems should be permitted to pass judgment.

Mr. Miller, drag out your Inskip or Smolley tables and divide any number of feet, inches and fractions, say an easy one like 7 ft.-9 $\frac{1}{2}$ in. into 2, 3, 4, 5, 6 or 10 parts. Then divide its equivalent, 2379 mm. into the same number of parts. Then convert 1546 cu. ft. into gal. and lb. of water. How much easier to convert its equivalent 53 cu. meters into liters and kilograms. Convert 37 acres into sq. ft. and compare the conversion of 17 hectares into sq. meters. And even Mr. Miller would hardly want to go back to pounds, shillings and pence.

F. T. HARDING
St. Paul, Minn.

BUILDING UP WORN PARTS

Sir:

Please send a copy of the article by A. W. Hothersall, "Building Up Worn Parts by Electrodeposition," from the issue of Nov. 23.

LEO P. TARASOV
Norton Co.,
Worcester, Mass.

• Tear sheets mailed.—Ed.

BLANKING IMPLEMENT PARTS

Sir:

Punch presses are tools that are not common in this part of the country. In manufacturing agricultural implements we must take advantage of all labor saving equipment that can be of help when competition gets keen. We shall want to blank parts now sheared from templates and we need information showing pressures required for blanking, by metal gage

and shear area, and on the technique of forming by use of power brakes and fixtures. A new high frequency auxiliary generator is reported to permit increased production by enabling inexperienced operators to strike arcs more quickly. Further information on these subjects will be appreciated.

C. H. BROWN

Brown Tool Co.,
Breckenridge, Tex.

• For information on punch presses, "Press Work Pressures" by C. W. Lucas, McGraw Hill Book Co., 330 W. 42nd St., New York, \$4, will be helpful. You might also write to some of the press brake manufacturers for their literature. See the high frequency stabilizer developed by Westinghouse Electric & Mfg. Co., reported on page 76 of our April 13 issue.—Ed.

AGE HARDENING ALLOY

Sir:

Kindly inform us on the new precipitation hardening alloy containing 60 per cent copper, 20 per cent nickel and 20 per cent manganese described in Nov. 23 News Front.

DONALD P. BEAVER,
Metallurgist
Phosphor Bronze Smelting Co.,
2200 Washington Ave.,
Philadelphia, Pa.

Sir:

Who is producing the new alloy reported in the Nov. 23 News Front?

ARTHUR L. COLLINS,
Sales Manager
Horace T. Potts Co.,
Philadelphia, Pa.

• The developer is the W. M. Chace Co., 1600 Beard Ave., Detroit 9, which is in a position to inform you more fully as to its characteristics.—Ed.

WESTERN STEEL

Sir:

Please send us a reprint of the article on "Western Steel" by C. T. Post in the Sept. 7 issue.

ROBERT M. WEIDENHAMMER
Bureau of Foreign and
Domestic Commerce,
Department of Commerce,
Washington 25, D. C.

• Tear sheets mailed.—Ed.

SURFACE FINISH

Sir:

The engineering library wishes to obtain tear sheets of the three part article "Measuring and Designating Surface Finish" from THE IRON AGE issues of Oct. 19, Oct. 26, and Nov. 2.

T. P. HALL,
Chief Development Engineer
Consolidated Vultee Aircraft Corp.,
San Diego, Cal.

• Tear sheets mailed.—Ed.

POSTWAR PLAN

Sir:

Back in 1934 it was rumored that Hitler had a plan for pulling his nation up by its bootstraps. Government agents were to go into every factory and make the owners replace

all inefficient machines and government was to guarantee the credit. Agents were to canvass all homes to make people buy stoves, refrigerators, etc., on government guaranteed credit where necessary. The idea of an automobile for every family received much publicity then. This program was to make work for all Germans and credits could be paid up.

This is in a general way similar to what we have in mind for foreign countries; but why not do it for our people?

F. W. KLATT

W. W. Sly Mfg. Co.,
Cleveland

PERMANENT MOLD CASTINGS

Sir:

Please send a copy of the article "Modern Permanent Mold Castings" which includes a discussion of the application of permanent mold casting to steel.

W. J. POTTHOFF,
Manufacturing Engineer
The Emerson Electric Mfg. Co.,
8100 Florissant Ave.,
St. Louis, Mo.

• A copy of this article is being mailed.—Ed.

PRECISION CASTINGS

Sir:

Our plant has a "cliptomaniac" who makes it necessary for me to request copies of the following articles: "Equipment and Material for Precision Castings" by J. Albin from Nov. 9 and 16 issues, and "Precision Castings of Turbosupercharger Buckets," Feb. 10, and "Industrial Precision Castings," from Sept. 7 issue.

WILLIAM L. RUDIN,
Foundry Engineer
Universal Castings Corp.,
5821 W. 66th St.,
Chicago

• Copies of these articles are being mailed.—Ed.

WAGE INCENTIVES

Sir:

Some time ago a series of three articles in THE IRON AGE dealt with wage incentives and time study. Please send us reprints of these articles if available.

E. P. ROLLINGS,
President
Almetal Universal Joint Co.,
1553-55 East 55th St.,
Cleveland 3

Sir:

Please send me a reprint of "Your Incentive Will Work If Properly Planned." This is the last of a series of three articles on this subject appearing Oct. 19, Sept. 28 and Aug. 17.

J. K. WHEATER,
Tool Design Engineer
Grove Regulator Co.,
6529 Green St.,
Oakland 8, Cal.

Sir:

The articles on time study are very useful. Please send me a reprint c.o.d.

JAMES W. CECIL,
Time Study Dept.
Dura Co.,
4500 Detroit Ave.,
Toledo

• Reprints will be ready in about a week and will be mailed at cost.—Ed.

Wheelabrator

Enables Dodge Manufacturing Corp.

To Realize
Numerous
Savings

DODGE MANUFACTURING CORPORATION *Engineers and Manufacturers*

NEW YORK
CHICAGO
PHILADELPHIA
SAN FRANCISCO

MAIN OFFICE AND PLANT
MISHAWAKA, INDIANA

MINNEAPOLIS
ATLANTA
DALLAS
NEW ORLEANS

October 7, 1944

American Foundry Equipment Company
Mishawaka, Indiana

Gentlemen:

In the six months that we have had our 48" x 48" Wheelabrator Tumblast in operation, we have realized a number of savings which I feel sure you will find interesting.

SAVES MANPOWER

Prior to the installation of the Wheelabrator Tumblast we were dependent upon a battery of tumbling mills and an air blast room for the cleaning of our gray iron and semi-steel castings. To handle our production with this equipment we operated the room two full shifts, with much of the work handled unsuitable for this type of cleaning. Now we need operate the room for only a part of one shift and then only for castings too large for the Tumblast.

SAVES FLOOR SPACE

Nine of the tumbling mills have now been eliminated. In the floor space resulting we have moved our grinding and finishing room. The Wheelabrator Tumblast unloads onto a slat conveyor with the parts being carried to the sorting benches. This eliminated a laborious and costly handling problem.

SPEEDS PRODUCTION

A typical Wheelabrator Tumblast load consists of 52 light duty sleeve castings each weighing 47 pounds for a total weight of approximately 2500 pounds. This quantity of work is cleaned in 8 to 10 minutes whereas several hours had been needed to rattle the same amount of work.

IMPROVES QUALITY

In addition to faster and cheaper cleaning we are experiencing another tangible benefit in that babbitt will adhere to the surfaces of Wheelabrated bearings much better than it did to a rattled surface. The #18 grit produces a thoroughly cleaned matte finish to which the babbitt is permanently bonded.

Probably no other single piece of equipment installed in our foundry has done so much to facilitate the flow of work through our plant. The Wheelabrator Tumblast is now an indispensable piece of equipment in our foundry.

Yours very truly,

DODGE MANUFACTURING CORPORATION
H. B. Voorhees
H. B. VOORHEES
Asst. Foundry Supt.



POWER TRANSMISSION, MATERIALS HANDLING AND SPECIAL EQUIPMENT



American
FOUNDRY EQUIPMENT CO.
MISHAWAKA, INDIANA

510 SOUTH BYRKIT STREET

World's Largest Builders of Airless Blast Equipment

This Industrial Week . . .

- **Higher Ingot Output Seen**
- **Extended Deliveries Common**
- **Wire Market Extremely Active**

FAR from getting a breathing spell as the year comes to a close, the steel industry it appears this week was heading for higher operations, much more extended delivery, impacts of sudden and varied military demands and certainly an intensification of war plans already made. War news from abroad makes it fairly certain that the loss of tanks, artillery and ammunition in recent weeks will place extreme pressure upon the output of those items on the home front.

It will probably only be a matter of weeks before the same hectic pressure period which existed many months ago will again make its appearance. While many observers are in accord that a secondary war production drive is already in the making, some factors may have been overlooked.

Passage of time as well as reverses in Europe makes Japan stronger, permits her to better utilize the materials drawn from her new empire and allows her to perfect her island defenses. Even though she will be defeated when the full weight of the Army and Navy can be brought against her, every month elapsing before V-E Day makes the task more formidable.

An apparent premature viewpoint in estimating the date of V-E Day by the Armed Forces themselves will probably make those in command of the supply situation more super-cautious than usual. Instead of estimating needs for the future Japanese campaign along past lines, the margin of safety in all fields of equipment will probably be much greater. This may be a progressive factor and any reverses will tend to raise the sights on ultimate requirements for the defeat of Japan.

The only conclusion to be drawn from these two factors is that the original estimate of 40 per cent in cutbacks on the defeat of Germany made by WPB officials some time ago is undergoing constant revision. Guesses now are that cutback estimates on V-E Day have slipped to about 15 to 25 per cent and may be lower, depending on future battlefield events.

Steel making operations in many districts this week were kept to as high level as a possible consistent with normal holiday losses induced by absenteeism or custom. Many companies maintained raw steel output over Christmas but curtailed finished steel operations. Heavy bookings required the production of every ton of steel possible and the full utilization of labor, which was the main reason for many plants eliminating the holiday shutdown. Incidentally and fortunately for the war situation, this year's Christmas activity was in strong contrast to a year ago when operations were marred by strikes and predictions were rife of approaching cutbacks and idle capacity.

AS the year draws to a close it is evident that net new bookings for the period will be about 10 per cent larger than in 1943. A flash finish is indicated with new business for December running to 15 per

cent or more ahead of November. Furthermore, there are more extended deliveries across the board than at the beginning of the month. Openings due to cancellations, which a few weeks ago afforded scattered opportunities to secure favorable deliveries on some items, have been virtually eliminated. Sales offices report that customers are anxious for rapid acceptance or rejection of proffered orders so that they may shop elsewhere if schedules are full.

Some farm implement steel scheduled during the first two quarters has been pushed back a full quarter because labor shortages have placed manufacturers behind their time table. On the other hand heavy pressure is reported for delivery of farm implement springs and grain drill tools needed for spring implement sales in warm sections of the country.

Substantial orders for bullet core steel have developed from the revised small arms ammunition program. Tonnages are on the same plane as when the original program was at its height more than a year ago.

Failure of civilian production to come up to past estimates under the spot authorization program has already in one case in the Chicago district resulted in a manufacturer seeking direct war contracts.

Jobbers report heavy demand for merchant wire products, especially nails. Merchant stocks have ebbed to a new low. Welding wire demand for the first half of 1945 threatens to tax productive capacity and some manufacturers already are turning away orders for that period. Wire rope likewise continues taut. Domestic orders for electrical wire and cable are spotty and not as large as they were in early 1944.

The Colorado and Wyoming Railroad has placed 50 70-ton ballast cars with American Car & Foundry Co., St. Louis. The Central of Georgia has ordered 100 50-ton pulpwood cars from Greenville Steel Car Co. Kentucky and Indiana Terminal has ordered two 1000-hp. switchers from Baldwin Locomotive Works.

In recent weeks the already overextended demand for galvanized sheets has been jacked up again. Efforts are being made to step up galvanized sheet output, but in view of the manpower problems and also because galvanized production is already high in spite of current difficulties, a further substantial increase might run into a stone wall unless a hole can be found. Efforts are already underway to seek idle electrolytic tin plate lines for the production of galvanized sheets. Meanwhile Army and Navy demands for this product are expected to remain at high levels.

The scrap market showed extreme strength this week with the immediate outlook indicating a retention of ceiling price levels for awhile at least. THE IRON AGE steel scrap composite price remained unchanged at \$19.17 a gross ton, which reflected ceiling levels for No. 1 heavy melting steel at Pittsburgh, Philadelphia and Chicago.

CANADIAN LAYOFFS—Canadian mills are laying off some workers as war orders draw to a close without apparent renewals at the end of the year. Restrictions have been removed on the purchase of machine tools as the Ministry of Supply recognizes the completion of tooling work for all production. Rumors are widespread that most British war orders will be cancelled after the first of the year, and the rolling stock and agricultural implement manufacturers are well along toward reconversion.

BACK PAY—Back pay of \$1,250,000 was distributed among 15,000 present and former employees last week in U. S. Steel's Federal shipyards at Kearny and Port Newark, N. J. The special pay day was arranged in order to distribute the back pay before Christmas. The extra pay was awarded by a directive of the Shipbuilding Commission of the National War Labor Board. This provided for a reclassification of hourly wage rates in 28 occupations, retroactive to June 23, 1943. The amounts paid cover the 14-month period from that date to Aug. 20, 1944, as the new rates have been paid currently since then.

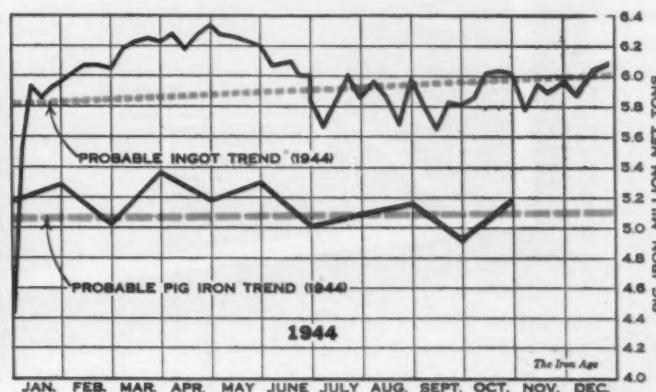
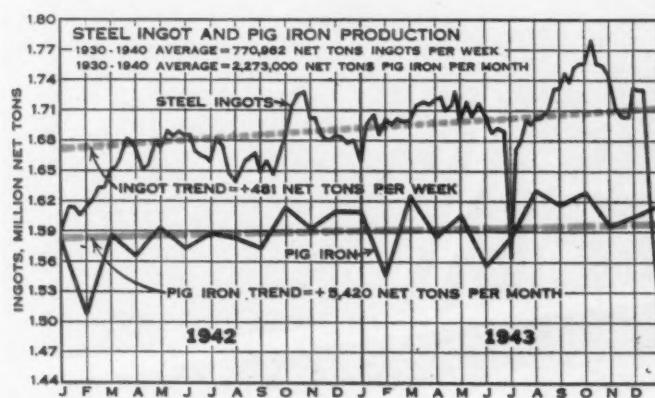
SPECULATORS GET SUPPORT—The protest against the sale of war surpluses to speculators is not wholly justified by the facts, according to John G. McLean, *Harvard Business Review*. "Proposals to distribute the war surplus exclusively through regular channels have appeared so plausible that for the most part they have escaped critical evaluation and analysis," he said. Four fundamental questions are raised by Mr. McLean. They are: (1) Would the prevention of sales to speculators be administratively feasible? (2) To what extent are regular outlets willing to engage in the distribution of surplus stocks? (3) What are the activities and functions of the new business organizations now developing to speculate or trade in surplus materials? (4) Would the elimination of those firms aid in the prevention of 'windfall transactions' or serve any other useful purpose?"

POSSIBLE SCRAP FREIGHT RATE BOOST—Imminent decision is expected on a shippers' proposal to Interstate Commerce Commission to establish a temporary rate of \$10 per gross ton for shipment on commercial bills of lading of scrap steel plate from north and south Pacific Coast points to steel mills in the Chicago region. The rate would be effective to Group D points for only 60 days during the cold weather period when the flow of local scrap is restricted. The present rate is equivalent to \$14.78 per gross ton and applies to a broad area of the middle and

west central states. If the rate is granted, shipment would be made in gondola cars, many of which are understood to be returning empty from the West Coast. A minimum shipment of 50 gross tons per car is provided. Precedent for the action may be contained in a special low rate for scrap iron and steel from Group D points to the coast which was in force during the period of heavy exports prior to the war.

SURPLUS PROPERTY ANGLES—Under the provisions of the Surplus Property Act, interested buyers of government surpluses will soon have the Small War Plants Corporation to contend with. Maury Maverick, SWPC Chairman, is awaiting the promulgation of rules and regulations by the Surplus Property Board, which will add the 107 regional and district offices of SWPC to the 75 offices of the Treasury, RFC, Maritime Commission, WFA, Army and Navy to the rapidly mounting confusion that attends the sale of surplus goods. SWPC's mission is to prevent "discrimination" against small business in the disposal of surpluses. However, the powers given to SWPC under the Surplus Property Act are so broad that certain legislative circles, which originally supported the legislation supporting SWPC, are beginning to wonder what they have created.

ELECTRIC FURNACE OUTLOOK—Sam Arnold, American Bridge Co.'s electric steel furnace expert has the following to say: "The greatest advance made in electric furnaces in the past few years has been the installation and operation of relatively large arc furnaces. The use of these furnaces in turn has been made possible by the development of large graphite electrodes and improvements in the mechanical design and application of electrical equipment. The so-called 70-ton furnace with a holding capacity of better than 180,000 lb. is close to the maximum size of furnace which can be operated with three electrodes. Some of these Type 70 units have been equipped with 15,000 kva. transformers and indications are that 5000-kw. input per electrode is close to maximum amount of energy which can be satisfactorily dissipated in the surrounding scrap. Larger furnaces, of course, can be constructed and higher power inputs can be obtained by the use of multiple three phase groupings of electrodes. It is questionable, however, whether the slight advantages to be gained in the reduction of radiation and labor costs will outweigh the disadvantages of higher power demand and loss of a certain amount of flexibility."



Steel Ingot Production by Districts and Per Cent of Capacity

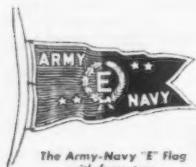
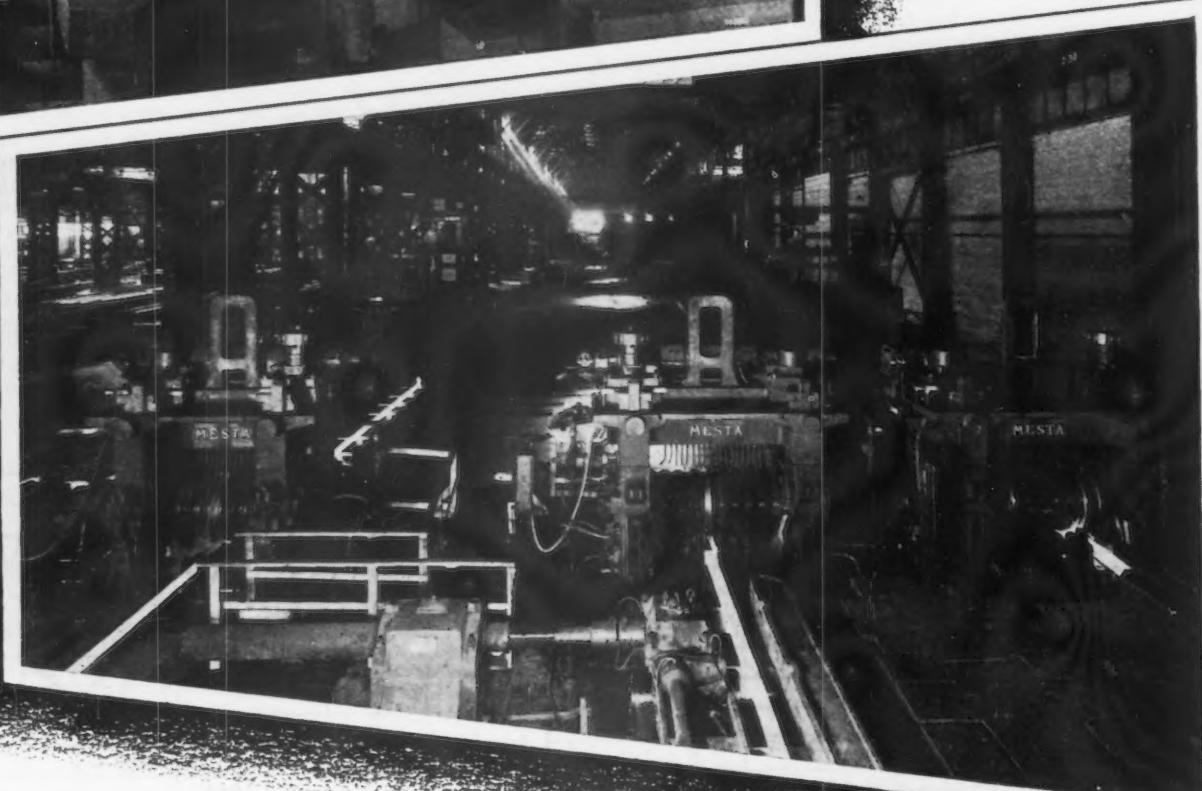
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 19...	91.0	100.0	92.0	96.0	96.5	101.0	91.0	99.0	100.0	89.5	95.5	94.5	90.0	95.5
December 26...	87.0	97.0	98.0	92.0	92.5	97.0	87.0	95.0	92.0	86.0	91.5	90.5	86.0	92.0

Note: All rates for Dec. 26 are estimated.

MESTA BAR MILLS



At the Chicago District's new electric steel plant . . . a Mesta 36" Roughing Mill for supplying billets to the 32" Bar Mill. The Leader, Intermediate and Finishing Stand of this mill are shown below.



The Army-Navy "E" Flag
with four stars
flies over the Mesta Plant

ROLLS AND STEEL MILL EQUIPMENT
HEAVY DUTY MACHINE TOOLS
FORGINGS

BUY EXTRA
WAR BONDS

MESTA MACHINE COMPANY • PITTSBURGH, PA.

Production in 1945 Faces Materials Shortages

Pittsburgh

• • • In looking at the steel production picture for the first quarter of 1945, there are some dark spots in what has been up to now a silvery cloud. Those dark spots are raw materials, coal, coke, scrap and pig iron. Looking at the record on these items for the past three months tends to make pessimistic the observations for the coming quarter, because in every instance the supply has been dwindling. While this falling off has not been so sharp that steel production will be drastically affected, there probably will be some curtailment of production because of these factors.

Taking first the scrap picture, there has been an estimated drop in scrap stocks from July 31, 1943, to Nov. 30, 1944, of about 22 per cent and a drop of about 13 per cent from Jan. 31, 1944, to Nov. 30, 1944. The drop during the 11 months of this year was accounted for almost entirely since October. At a time of the year when scrap stocks normally are being built up, there was a substantial drop.

There are various reasons offered for this condition, one of which was war optimism. The steel industry was told in Washington by various government and Allied officials that the end of the war was in sight—that it would not last the year out. Consequently, burdens of high cost metallics were worked off so that the industry would not be caught in a sharply falling price market with ceiling price scrap. While the blame of scrap shortages will be placed with the industry by Washington as soon as the pinch is felt, in reality the steel industry was attempting in the only way possible to work itself out of an awkward economic position and was carrying out orders. It will be recalled that the major price breaks in scrap occurred in October and buying during October and November was at a minimum.

Another important metallic that has dropped off in supply is pig iron. From March, 1944, to November, 1944, pig iron production in the United States dropped about 8 per

... by T. E. LLOYD ..

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cent, while inventories declined more than 17 per cent from the end of October to the close of the year. While 228 furnaces were in blast on Jan. 1, 1944, and 17 idle, this picture likewise has undergone a change in the wrong direction. On Dec. 1, there were only 203 furnaces in blast, while six were out for relining and 21 were idle. Eight more furnaces were on production of ferro-alloys such as ferro-manganese and two were producing spiegel. This total does not include the four new DPC furnaces, which are believed not in production yet. These are the Pittsburgh Steel Co., Daingerfield, Texas; Geneva, Utah; and Inland Steel Co. units. Manpower shortages will prevent

bringing back into blast any substantial capacity that is now idle.

So, on close examination, the metallics used in the production of steel have been on the decline during the past quarter, and the effect of this trend will not be felt until the first quarter of 1945. At that time, the tightening up of these supplies will nibble at the steel production rate and probably knock it down a few points. Of course, this depends entirely upon the continuance of the war in Europe, and, the present news is making everyone just as pessimistic as the news of Patton's march through France made everyone optimistic.

Fuel supplies do not tend to brighten this darkening picture. Nineteen hundred forty-four coal production is estimated to be about 6,000,000 tons short of the coal for this year, which was set at 616,000,000 tons. This was largely the result of disturbances at the coal mines throughout the year, mainly those that hinged around the union representation drive for fire bosses, superintendents, mine foremen and white collared workers.

Coal stocks at rail points and mines show a varied picture, but one that is for the most part not too good. From Sept. 1 to Dec. 1, there was a decline in high volatile coal stocks of about 1 day's supply. On medium volatile coal there was a slight increase. At docks and by-product coke plants there was an increase of about 1.3 days' supply of high volatile coal and an increase of about one-half day's supply of medium volatile material. While it might be pointed out here that coal is holding its own, the number of days' supply is very low, being less than 25. Any widespread disruption of mining operations, even for a short time, would cause chaos in steel production.

Table I shows the coal stocks at by-product coke plants and at steel and rolling mill mills. While steel and rolling mill stocks are up a bit at the end of the year, the requirements of coal for this purpose are only a fraction of the by-product coke plant requirements.

The beehive coke making industry

TABLE I
Coal Stocks at Byproduct Coke Plants
and at Steel Plants and Rolling Mills

Source—Bureau of Mines

1943 MONTH	STEEL AND ROLLING MILLS	BY COKE SUPPLY ON HAND	(DAYS SUPPLY)
JANUARY ...	29	40	
FEBRUARY ..	33	E 39	
MARCH	37	40	
APRIL	39	39	
MAY	36	37	
JUNE	33	30	
JULY	34	28	
AUGUST	33	27	
SEPTEMBER ..	29	26	
OCTOBER ...	22	27	
NOVEMBER ..	22	24	
DECEMBER ..	23	25	
1944			
JANUARY ...	22	24	
FEBRUARY ..	23	24	
MARCH	26	22	
APRIL	28	22	
MAY	30	24	
JUNE	32	22	
JULY	29	23	
AUGUST	29	24	
SEPTEMBER ..	29	24	
OCTOBER ...	29*	24*	
NOVEMBER ..	29*	23*	
DECEMBER ..	30*	22*	

*Estimated Stocks

is likewise operating at a declining scale, mainly because of manpower problems and, secondly, because of cost. In the main beehive coke producing areas of Pennsylvania, the number of ovens in operation dropped 17.2 per cent from April 1, 1944, to Dec. 1, 1944.

One of the biggest factors in coal production in the terminal month of 1944 and January, 1945, is the fact that the United Mine Workers will be negotiating another contract in 1945. These negotiations will start about Feb. 1, and it will be to the interest of the mine workers to keep coal stocks at steel plants down to a minimum in order to make a strike affect steel production quickly. John L. Lewis, as smart a union man as is in the business, long ago learned that low stocks of coal on hand will bring the steel companies to terms much more quickly than stocks large enough to let a strike drag on for weeks before operations are affected.

Over and above all of the restrictions in supplies is a very serious manpower situation. Coal mines are seriously hampered by the lack of help, and this condition is beginning to make itself felt in coal production. Early in the year, the average weekly coal production was about 12,500,000 tons a week and currently is running about 11,300,000 tons a week. The requirements for coal for 1945 are estimated to be about 595,000,000 tons, but manpower shortages combined with such other factors as more difficult mining operations will cut production to about 575,000,000 tons, or 20,000,000 tons short of needs.

So, in summing up the current supplies of vitally needed raw materials, the steel industry has many factors that can impinge upon high operating rates. Any one or all of them

can cause serious disruption of steel production, but the most potential factor is coal, since the element of negotiating a union contract is superimposed upon already low coal

stocks. While metallics show a tendency to be very tight before the warm weather permits a freer flow of scrap, this pinch will not be so severe as a coal strike.

Study of Aircraft Finances Details Postwar Problems

Cambridge, Mass.

• • • Postwar development and employment in the aircraft industry will be seriously impeded unless industry and government make coordinated preparations for orderly and prompt conversion to peacetime production, states a Harvard Business School study issued recently.

Using projected financial statements of ten leading airframe manufacturers for the years 1945 and 1946, and assuming for the purposes of the study that large-scale aircraft production will cease in December, 1945, Professor Tom Lilley and Instructor L. La Verne Horton analyze the financial problems of conversion and make these over-all conclusions:

"1. The average airframe manufacturer will be able to survive the immediate postwar adjustment period with a reasonably satisfactory financial position if these conditions are met: (a) if contract terminations are administered with a reasonableness which is consistent with the broad policies set forth in the Contract Termination Act of 1944; (b) if the company sets up its own administrative organization to handle terminations properly, concentrating prior to the end of the war on effective inventory management; (c) if

the management curtails expenses realistically and rapidly.

"The progress made during the last year in planning for contract terminations and conversion affords some grounds for optimism that these conditions may be fulfilled.

"2. The risk is great, however, that uncertainties and delays during the conversion period will unnecessarily impede the constructive developmental work required to promote maximum peace-time production. In order to eliminate confusion and unnecessary curtailment during conversion, the following steps are suggested:

"(a) Uncertainties regarding contract termination procedures can be reduced by a concerted effort on the part of industry and government organizations to pre-plan the methods, standards, and bases for making quick termination settlements well in advance of large-scale terminations.

"(b) Uncertainties regarding the loss carry-back provision of the tax law can be reduced by adoption of a Treasury proposal to accelerate payments of loss carry-back refunds.

"(c) Uncertainties regarding future aircraft production and development can be reduced by making every effort to determine future national air-power policies in advance of the end of the war."

"Entirely apart from termination and tax problems, the basic question facing each aircraft manufacturer is: conversion into what? The answer will be vitally affected by the post-war aviation policies adopted by the government, including policies for Army-Navy procurement, plant and equipment disposal, surplus aircraft disposal, and Civil Aeronautics Board certification of new transport routes."

Though industry and government are giving increasing attention to conversion, much of the detailed planning necessary for an orderly transition remains to be done, the report states:

"During the past year, industry and government leaders have given increasing recognition to the vital importance of an orderly conversion of the aircraft industry to peacetime operations. The influence which orderly and prompt contract termina-

WATER HEATERS: Twenty-two feed water heaters are ready for shipment from Elliott Co. plant at Jeannette, Pa. Destined for the Navy's new ships, they vary in size from those used on destroyers to carrier size.



tion settlements will have on postwar levels of employment in the major aircraft production centers of the country is generally recognized. Increasing attention is being paid to the importance of keeping alive aeronautical development work and a nucleus of production facilities and skills at the time when large-scale wartime contracts are being cancelled. Recognition is given to the effect on our national air power of continued development, not merely in military aircraft, but in transports which must compete in world markets.

"Despite this increasing recognition of the importance of an orderly conversion, many problems remain to be solved. Any forecast of the effect which the transition from war to peace-time production will have on the financial position of the aircraft manufacturers is extremely difficult to make, for much of the detailed planning necessary for an orderly transition remains to be done. A danger still exists that the lack of coordinated industry and government preparations and the sheer mechanics of contract termination procedure will so delay conversion that future employment and development will be harmed."

War Expenditures Dropping Slightly

Washington

• • • United States war expenditures during November amounted to \$7,095,000,000, a decrease of \$352,000 compared to October expenditures, or 4.7 per cent, according to figures compiled by the Department of the Treasury and announced by the War Production Board. November expenditures for war purposes were the lowest for any month this year.

The rate of war expenditures per day averaged \$272,900,000 in November compared to \$286,400,000 in October. The daily rate is based on the number of days in each month upon which checks were cleared by the Treasury.

The Government has expended \$236,700,000,000 for war purposes during the period July 1, 1940, through Nov. 30, 1944. Expenditures during the period Jan. 1, 1941, through Nov. 30, 1944, totaled \$234,800,000,000.

These figures include checks cleared by the Treasury and payable from war appropriations, and net outlays of the Reconstruction Finance Corporation and its subsidiaries.

Arthur H. Dix Leaves THE IRON AGE Staff



ARTHUR H. DIX

THE IRON AGE announces with great regret that Arthur H. Dix, manager of Reader Service Department, will leave this organization on the first of January, to take charge of the departments of Reader Service and Research for the Conover-Mast Corp., 205 East 42nd St., New York, publishers of *Mill & Factory*, *Purchasing*, *Aviation Maintenance*, *Plant Production Directory*, and *Liquor Store and Dispenser*. Mr. Dix was the originator and author of the very popular editorial feature, *FATIGUE CRACKS*. Along with his host of friends and admirers in the metals industry, we on THE IRON AGE staff send with him our deepest respect and heartfelt wishes for success and happiness in his new position.

Factory Goods Output Below 1943 Peak Load

New York

• • • October represented the sixth consecutive month in which factory output has run below the level of a year ago, according to the Alexander Hamilton Institute. The decrease during this period more than offset the gain which occurred earlier in the year. Consequently, the quantity of manufactured goods produced during the first ten months of this year was 1.4 per cent below the volume in the same period last year.

Total output for the full year of 1944 will probably fail to attain the record high peak of 1943 although the difference will be slight, with the output in 1944 exceeding by a wide margin the volume in any one year previous to 1943.

Prices of manufactured goods, on the average, rose in October to the highest level for the war period. The increase over the September level, however, was slight and failed to offset the drop in the quantity of goods manufactured. Consequently, the index of the value of goods produced declined from 304.8 in September to 302.6 in October, or to the lowest level since February, 1943, with the exception of July, 1944.

Nevertheless, the index of the value of factory output in October was still above the level of farm income which

is a measuring rod of normal for the value of factory output. While the index of the value of factory output was 302.6 in October, the estimated index of farm income in 1944 is only 243.0 although the estimate of farm income has recently been revised upward to the highest figure on record.

It is obvious that manufacturing activity continues to be in a vulnerable position and subject to a recession when the abnormal support afforded by the government's war requirements is removed. This is particularly true since farm income is highly inflated and is likely to experience deflation when the inflationary effect of government deficit-spending is curtailed. A drop in farm income will mean a lower normal level for the value of factory output and, consequently, a greater recession in the value of factory output before a normal level is reached.

The number of civilians employed in the United States rose from 52,200,000 in September to 52,300,000 in October according to Alexander Hamilton Institute. The demand called for a greater increase but the supply was not sufficient to permit it, especially since the supply of labor declined from 53,000,000 persons in September to 52,900,000 in October, according to the Alexander Hamilton Institute. It was only by a further reduction in the small reserves of unemployed labor that the increase in employment was made possible.

Mills Lay Off Men In Canada As War Orders Draw to Close

Toronto

• • • In the Canadian steel markets deliveries of steel bars and sheets are becoming more extended and new orders continue to appear in good volume. Local mill representatives state that fresh buying is about evenly divided between war and civilian consumers, with delivery against civilian orders indefinite. According to recent reports there will be definite slowing in Canadian war production with the turn of the year. Already several companies have started to lay off workers as war contracts draw to a close with no renewals in sight. It is stated that many British war contracts are to be cancelled at the year end, while Canadian production will be largely confined to a few special materials, with heavy shells featured.

Rolling stock builders and agricultural implement makers are the most advanced in the swing to peace-time operations, and both these branches of industry now are operating close to maximum capacity, with orders on hand that assure continuation of present schedules throughout 1945. In turn these are the most prominent buyers of steel and are given special classification with regard to delivery. On both carbon and alloy bars deliveries against new orders now extend

for six months into the future, while on sheets delivery is in June and on plate about two months. Meeting the demand for wire and nails has become a serious problem and mills are running well behind in deliveries. The difficulty in meeting requirements is credited to the shortage of raw materials and lack of skilled labor.

With structural shapes again available new construction projects are getting underway and many plants and additions that have been held up due to steel shortage will be going up at a rapid rate with the turn of the year. While structural steel letting were comparatively slow over the past few weeks, it is estimated that there are some 15,000 tons pending for almost immediate closing for

building projects alone, while a further 10,000 tons are said to be in prospect for new bridge construction.

Officials of the Department of Munitions and Supply announced that all restrictions on the sale of machine tools have been removed, and Thomas Arnold, Machine Tool Controller, has relinquished his post. Removal of restrictions on the sale of machine tools is regarded as a natural consequence of Canada's war industry having passed the expansion stage and reached a point where it is well equipped. The department's action, also will pave the way for manufacturers who, considering the post-war period, are planning conversion of their plants from war to civilian production. With plants, tools and other equipment released from war production, and with most metals off the restricted list, civilian production is expected to show general expansion in the future.

New Pricing Policy Is Announced to Simplify Procedures

Washington

• • • The War Department set in motion on Dec. 20 a new program to achieve closer pricing by reviewing prices of all prime contractors and subcontractors now subject to renegotiation. By adjusting in advance any prices which are unduly high, the program is designed to eliminate ex-

cessive costs, as well as the excessive profits which are now returned to the government in renegotiation.

In announcing the new "Company Pricing Program" Col. Fred. C. Foy, Director of the Purchases Division, Army Service Forces, said: "This program extends a thorough analysis of price to some kinds of subcontract prices, and to some other prices, that have been too high in the past. We believe it will save the taxpayers' money, and will help combat the forces of inflation. Most important of all, however, the program will promote increased efficiency in American industry."

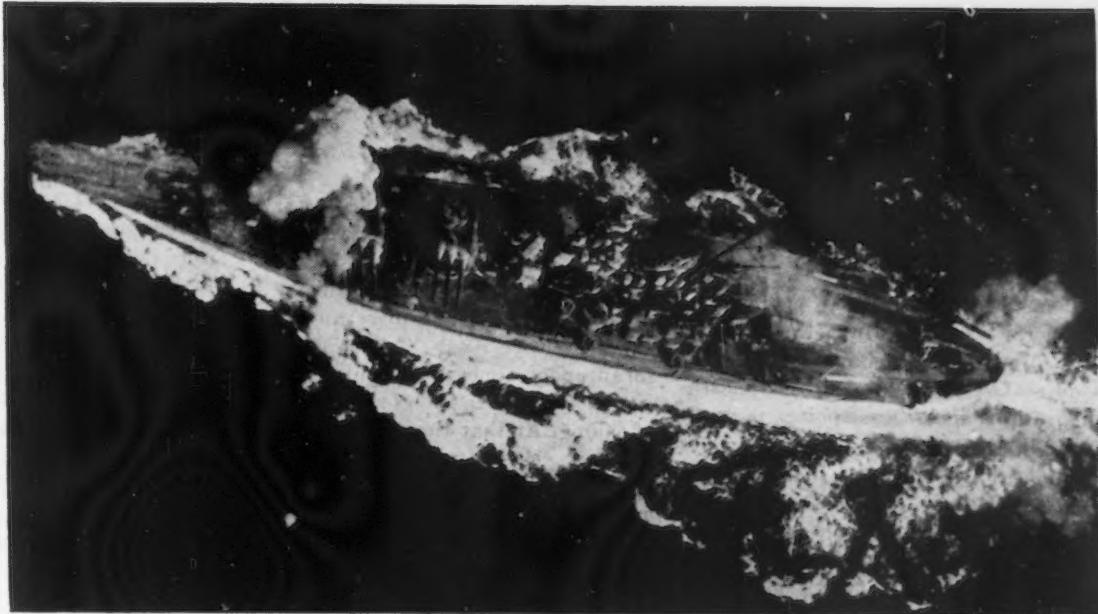
Colonel Foy pointed out that companies which establish close-pricing policies receive favorable consideration for a higher profit in renegotiation, and that close prices are also a factor in retaining contracts when a production program is reduced.

Every company assigned to a War Department office for renegotiation is automatically assigned to the same office for company pricing. Companies whose pricing policies are inconsistent with the pricing responsibilities of the War Department are asked to meet with a company pricing team for general pricing discussions. Companies don't have to wait for routine selection; may request an immediate pricing review by the offices to which they have been assigned.

PERSIAN GULF: To feed into southern Russia, the American Army has been operating in this area sending more than four million tons of supplies. This is the only theater where Americans, Russians, and British soldiers are actually working sided by side.



• • •
DIRECT HIT:
Curtiss Hell-diver under competent Navy direction dropped these two hits that shook the battleship Yamamoto. Action took place as the pride of the Japanese fleet was fleeing from Admiral Halsey's fleet in October.
• • •



Critical Programs Tightened by Army

Washington

• • • Tightening up to improve critical programs is going on at WPB, and last week Army and WMC and WPB officials decided two steps with that view in mind.

The WPB coordinating area production urgency committee with the approval of the Armed Services decided that henceforth all procurement officers will inform local production urgency committees seven days in advance of the intention to place a contract in a particular area whenever the contract price exceeds \$100,000. This is an effort to keep new contracts out of tight labor areas and to seek facilities in loose labor areas to improve the manpower situation.

It is the first time that WPB and WMC have ever had any hand in the placing of contracts, and although procurement agencies have agreed to the week's notice, strategic demands may prevent giving this much notice in every case. Whenever it is necessary for the Army or Navy to place a contract without giving the agreed notice then the agency is instructed to give the area production urgency committee notice as soon as possible.

The other step by WPB was to request the Army and Navy to review all engine requirements for 1945 with a view to canceling all orders for spare engines which will not be absolutely necessary to include in L 1945 programs. This action was taken to improve foundry schedules and withdraw all but the most essential work from them.

At the same time, it is expected that the Army will come up with new increased programs for engine parts, since it has been recently decided that it is cheaper and quicker to repair existing engines rather than install spares in all cases. While these new programs will complicate the foundry order boards to a degree, WPB officials hope that engine cancellations will be substantial enough to more than compensate for demands of the new programs.

Living Cost Rise Small in November

New York

• • • Living costs for the average family of wage earners and lower-salaried clerical workers in the United States advanced one-tenth of one per cent from October to November, according to the National Industrial Conference Board.

This slight increase brought the Board's index to 105.2 (1923=100), the highest level since February, 1926, and 22.3 per cent above that of January, 1941, base month of the Little Steel formula.

There were increases of 0.3 per cent in the cost of clothing, 0.1 per cent in fuel and light, and 0.4 per cent in sundries. There was no change in the cost of food and housing.

Living costs in November were 1.4 per cent higher than a year ago.

Purchasing power of the dollar, in terms of 1923 goods, was 95.1 cents in November. A year ago it was 96.4 cents.

New Steps Are Taken To Release Manpower

Chicago

• • • The Chicago area War Manpower Commission is re-examining about 2000 exemptions from the mandatory 48-hr. week granted this spring. Lester Brown, WMC Area Director, states that many exemptions may be cancelled or modified.

In a companion step to ease the tight manpower situation here efforts are being made to readjust manpower ceilings with cuts wherever practicable.

Overall cuts in employment ceilings will not produce sufficient workers of the types needed, William H. Spencer, WMC Regional Director, declared. Ceiling reductions will be made not only in unclassified activities but in some essential fields not producing items urgently needed currently.

"While we do not at this time propose to cut ceilings which will result in the indiscriminate laying off of workers," he said, "We shall ask various employers by groups or industries to let the must plants have the needed workers immediately on a lend-lease basis."

Spencer threatened "administrative sanctions" against employers who hire workers without statements of availability or referral by the USES or who hire beyond their ceilings, and denounced some employers who are returning to "prewar standards".

Spencer declared there are approximately 175 "must" plants in Chicago alone with a manpower shortage of between 15,000 and 20,000 workers.

Shippers Propose Temporary Scrap Steel Freight Rate Increase

Chicago

• • • Imminent decision is expected on a shipper's proposal to Interstate Commerce Commission to establish a temporary rate of \$10 per gross ton for shipment on commercial bills of lading of scrap steel plate from north and south Pacific Coast points to steel mills in this region.

The rate would be effective to group D points for only 60 days during the cold weather period when the flow of local scrap is restricted. The present rate is equivalent to \$14.78 per gross ton and applies to a broad area of the middle and west central states comprising groups D, E, F, G, H, I, J, and N.

If the rate is granted, shipment would be made in gondola cars, many of which are understood to be returning empty from the West Coast. A minimum shipment of 50 gross tons per car is provided.

Precedent for the action may be contained in a special low rate for scrap iron and steel from group D

points to the Coast which was in force during the period of heavy exports prior to the war.

During the early part of this year, prior to the softening of scrap prices, shipment of West Coast shipyard scrap under allocation to mills in this region was made on government bill of lading. At that time the abundance of West Coast scrap insured a shipping point price which would allow all the material to be laid down here at prices only slightly in excess of prevailing local ceilings on railroad heavy melting steel. Currently, however, Coast prices on heavy melting steel are quoted at \$13.50 at Seattle, \$14 to \$15 at Los Angeles and \$16 to \$16.75 at San Francisco. This would mean a delivered price here, assuming somewhat lower prices at Portland, in the neighborhood of \$23 to \$23.50.

The ceiling price here of \$19.75 on railroad heavy melting steel is the most nearly comparable grade. Considering the type of scrap which could be secured, such a premium might be well within the range of reason, par-

ticularly for those mills almost entirely dependent on scrap for their melt.

Even if the rate is not granted, it gives further proof of strength of the local market and the type of thinking which has resulted from removal of the lid on permissible springboards. If bidding should become too spirited for Western scrap, resumption of allocations and shipments on government bill of lading might even be requested as a price control measure. Such action, however, is believed to be in the realm of fantasy rather than fact, because it could be justified only in the case of threatening withdrawals from local inventories. So far, local mill inventories, with exceptions, remain in good shape, although steady withdrawals are being made which in time may require replenishment.

New Steel Product

Line Is Possible

Pittsburgh

• • • The possibility of a new line of products to be introduced by the steel industry after the war is definitely shaping up in the form of a line of cold formed standard shapes, being formed from strip steel. Steel company officials in this area have been meeting, more or less informally, and discussing the potentialities of the markets and the mechanical problems of manufacturing such products.

There is no doubt but what the automobile builders can show the steel industry cards in spades in cold forming, since this fabricating method has been used quite extensively in motor car construction for many years. However, a marketable line of formed strip products to supplement hot rolled shapes and sections will bring steel producers closer to the consumer markets and provide additional outlets for strip steel.

Some of the production that are being considered as standard items to be made by the mill and marketed possibly from the mill but surely through warehouses include such items as angles, channels, U's, Z's, T's, bulb angles and perhaps I beams. Of course the load bearing capacities of such products will be extremely limited but when used with these restricted limits of physical strength, the products could have wide applications.



FLYING WHEEL HOUSE: A 42-ton unit of a new type of superstructure made of corrugated steel panels and developed at the Ingalls Shipbuilding Corp. yard at Pascagoula, Miss., for the all-welded 18,-000-ton transports it is building, is hoisted into place.

Electric Appliance Men Predict Higher Employment After War

Washington

• • • Prediction that for five years after the war employment in their industries will be 50 per cent above the prewar level and the volume of business will be 200 per cent of 1941 was made by members of the Commercial Electrical Food Preparation Equipment and the Commercial Electrical Cooking Appliance Industry Advisory Committees at their first meetings held recently with WPB.

Meanwhile, however, WPB officials have announced that for the year beginning with the last quarter of 1944 production of civilian commercial electric cooking equipment and commercial appliances has been authorized at 40 per cent of 1940. Commercial and heavy-duty ranges and ovens are an exception, their production being authorized at 70 per cent of the 1940 level. WPB pointed out that production authorizations will be assigned to manufacturers in accordance with their ability to work

under them without interfering with the war effort. A 30-day carryover from one calendar quarter to another will be permitted. While distribution will continue under control, WPB said that waffle irons, stock kettles, grills and coffee makers, for commercial use, have been added to the list of items that may be manufactured.

The probability of "spot authorizations" being made under PR-25 is remote at this time, WPB said, in view of extreme manpower shortages and re-emphasis on urgent war programs. Unanimous committee approval was said to have been given to a proposed plan of advance allocation of materials for reconversion at some future date.

The following materials, essential to the production of commercial electrical equipment, were described by government representatives as currently critical: Stainless steel, chrome, flexible wire, nickel anodes and chemicals for plating, tin, plastics and sleeve bearings.

Kaiser Shell Plant To Be Completed Soon

San Francisco

• • • When Kaiser Industries at Fontana and Denver get into full operation on artillery shells in the next few months their capacity will be double that of any other plant in the world. J. A. Krug, WPB chairman, told a press conference here recently. While in Southern California he visited the Kaiser steel mill which he characterized as an amazing accomplishment in production. He further disclosed that his inspection of California war plants revealed no evidence of lassitude or complacency on the part of workers or management and termed as magnificent the job done by Western labor and management in war production.

WPB will continue to make every effort to balance the economy of the Pacific Coast between war and civilian production so that the West will not be handicapped in the post-war period by concentration on war industry, while the rest of the country reconverts, Mr. Krug said. As long as Pacific operations continue the nation will need full West Coast capacity, it was said. Supply and transportation problems with ac-

celerated operations have impelled WPB to work with ODT on increasing the capacity of Western railroads, according to Mr. Krug.

Commerce Officials Want To Inherit Both WPB and OPA

Washington

• • • Commerce Department officials are now proposing that Commerce be given WPB's and OPA's industry ad-

COMING EVENTS

- Jan. 8-12—SAE Annual War Engineering Meeting, Detroit.
- Jan. 10-11—Institute of Scrap Iron & Steel, Inc., annual meeting, Cincinnati.
- Jan. 24—18th Annual Mining Institute of the College of Mines, University of Washington, Seattle.
- Jan. 24-26—National Screw Machine Products Association, annual meeting, Milwaukee.
- March 19-20—American Society of Tool Engineers, Cleveland.
- March 19-22—Machine and Tool Progress Exposition, American Society of Tool Engineers, Cleveland.
- April 4-6—SAE National Aeronautic Meeting, New York.
- April 12-14—Electrochemical Society, Inc., Philadelphia—Atlantic City Congress, Atlantic City, N. J.
- April 30-May 4—American Foundrymen's Association, Detroit.

Tomorrow's Speed

• • • Our friend, E. B. Terhune, president, *Boat and Shoe Recorder*, gives us an idea of future speeds:

—A recent airplane test of powerdriving attained a speed of approximately 720 miles an hour.

—If this speed could be accomplished in cruising or horizontal flying, the flying time between the United States and Great Britain would be about five hours.

—And allowing for five hours' difference between Eastern standard and British time, this means that a passenger who left London at noon would still find it noon when he arrived in New York.

—With the combustion engine still in process of making more speed and still more speed, it might be that some day an intrepid shoe man, accustomed to air travel, could ask "What time was it tomorrow when we left London yesterday? . . ."

—Or he might wire a business friend: "I'm leaving this noon on the 12 o'clock plane and will meet you yesterday in Shanghai."

visory committees to operate permanently after the war, and are suggesting what a fine Secretary of Commerce former WPB Chairman Donald M. Nelson would make.

Commerce would set itself up as advocate before all other agencies for businessmen accustomed to the "usual Washington run-around." Further, commerce executives think it would be nice if the department could inherit all WPB's and OPA's records, as it did those of the NRA.

Foundries Still Short On Manpower for Schedules

Harrisburg

• • • Sixty-two Pennsylvania foundries and forges need immediately 2997 additional workers to meet vital production schedules, the State War Manpower Commission announced.

These firms, now employing 39,762 persons, indicated they must have 42,759 employees on the job by Jan. 1, if steadily expanding production requirements for artillery ammunition and component parts for tanks and trucks are to be met, it was said.

Most of the forges and foundries are centered in the Pittsburgh, Philadelphia and Erie areas.

Industrial Briefs . . .

• **RESELLS**—The new wire mill built by Maurath, Inc., sold in September to Jack & Heintz Co., is now back in the hands of Maurath and will be occupied by Feb. 1. At Jack & Heintz it was reported that other plans for war work expansion had replaced original ones to take over the new Maurath wire mill.

• **ACQUIRES STOCK**—All the stock of the Askania Regulator Co., Chicago, has been acquired by General Precision Equipment Corp., New York.

• **NEW NAME**—Ballard Aircraft Co., Inc., New York, has changed its name to The Walter M. Ballard Corp., which henceforth will carry on the interior design and decorating activities of the Walter M. Ballard Co., Inc.

• **AWARDED CONTRACT**—Army Air Forces, Air Technical Service Command, Wright Field, Dayton, Ohio, has awarded Rheem Mfg. Co. a contract for design and development of an all-metal rotor blade for helicopters. Rheem is building the new type blades at its Aircraft Division in Los Angeles.

• **NEW APPOINTMENT**—Norton Welding Equipment Co., Milwaukee, has been appointed exclusive distributor covering the State of Wisconsin of the Alloy Rods Co., York, Pa.

• **LIQUIDATED**—Wellsville Iron & Metal Co., Pittsburgh, has now been liquidated due to the sudden death of S. W. Rubin.

• **OPENING OFFICES**—To provide expanded and speedier service to all users of carbide tools, Carboloy Co., Inc., Detroit, has established branch offices at 743 North Fourth Street, Milwaukee, and at 924 M. & M. Building, 1 Main Street, Houston, Tex.

• **DAMAGES**—A fire on Oct. 31 caused minor damages to the Cincinnati plant of the Charles Taylor Sons Co. After several days the plant was back in full production and orders are now back on a normal schedule.

• **BUYS COMPANY**—Buffalo Bolt Co. has announced completion of negotiations to purchase the entire capital stock of the S. M. Jones Co., Toledo, Ohio, pioneer producer of rods for oil-well pumping.

• **LEASES PROPERTY**—Reconstruction Finance Corp., through the Defense Plant Corp., has leased property in the old yards of the New York Central Railroad at Depew, N. Y., to erect one of the largest of several showrooms planned in the state to display surplus government equipment for inspection of prospective purchasers. Construction of temporary buildings on the extensive site is scheduled to get underway at an early date.

• **DISTRIBUTORS**—The Crosley Corp., Cincinnati, has recently appointed several distributors—The Legum Distributing Co., Baltimore, as distributor in Maryland and parts of West Virginia, Virginia and Delaware; Arizona Appliance Mart of Tucson and Phoenix, Ariz., as distributor in the State of Arizona; in Canada by the firm of Moffats, Ltd.; Weston, Ontario; Norman-Young Appliance Co., Dallas, in the northeastern part of Texas, and Modern Distributing Co., Cincinnati, southern Ohio, northern Kentucky and southeastern Indiana.

• **EXPANSION**—A leader in the production of porcelain enamel finishes, Ferro Enamel Corp., Cleveland, has planned alteration and expansion of the smelting building, the construction of 12 new smelters and the installation of a conveyor system at a cost of about \$350,000.

CIO Denies Steel Workers Plan To Strike in Future

Washington

• • • Confident that economic stabilizer Fred M. Vinson will come through with the fulfillment of wage increases granted by WLB in the steel wage case, a top CIO official on Dec. 21 denied that the steelworkers have any intention of calling a general strike at any time in the near future.

Persistent rumors were that USWA would call a "quickie" strike if economic stabilizer Vinson persisted in his refusal to put the WLB order into effect, and also that Mr. Vinson had requested CIO President Philip Murray to threaten OPA administrator Bowles with a strike in the steel industry if OPA should come up with recommendations for price increases for the steel industry. However, Mr. Vinson's strategy was supposed to be an effort to hold the line by making the steel industry absorb the wage increase and throw the responsibility for any strike upon Mr. Bowles' shoulders, if USWA went out. However, a CIO spokesman denied that Mr. Murray was going to do anything of the sort, but was merely going to stand pat on his demand that the WLB order be put into effect.

It is obvious, it was said, that Mr. Vinson could not hold the line if he simultaneously granted a price and a wage increase. The CIO spokesman said that Mr. Murray had not talked with Mr. Vinson since the meeting between Mr. Bowles and Mr. Vinson on Dec. 15.

Bunker Resignation Announced by Krug

Washington

• • • WPB Chief of Staff Arthur H. Bunker has resigned, WPB Chairman J. A. Krug announced on Dec. 19. Mr. Bunker in private life was executive vice-president of the Lehman Corp., New York.

While Mr. Bunker's old post will not be filled by a new appointment, it is understood that Captain J. D. Small, U.S.N., has assumed Mr. Bunker's duties. Captain Small has the title of Executive Officer.

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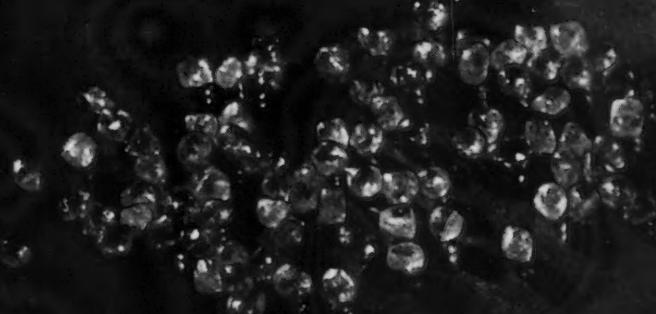
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Iron Mountain Goes Back to Production Of Ore for Koppers

St. Louis

• • • After nearly a year of preparation ore from historic Iron Mountain, Mo., went into the commercial production of pig iron recently in a mid-west blast furnace.

The mine is located in Iron and St. Francois counties. It has been rehabilitated by Ozark Ore Company, subsidiary of M. A. Hanna Company, Cleveland, with DPC cooperation. The company has about 20,000 acres of mineral holdings in the mine area.

The ore will be used in the production of pig iron in the blast furnace plant of Koppers Company, Inc., Granite City, Ill. This, also, is a DPC project. Koppers recently built a battery of coke ovens to produce the coke which goes into the manufacture of pig iron.

With the development of the ore mine within 80 miles of the complete Koppers blast furnace plant there will be available to the steel industry of the St. Louis area supply of pig iron produced locally and, to a large extent, from local raw materials.

Ozark Ore's mine annually will produce about 250,000 tons of ore ready for use in the manufacture of pig iron. All production will go to the Koppers plant.

The blast furnace plant of Koppers was "blown in" in the summer of 1941. It has a capacity of 1100 tons of pig iron a day. Koppers formerly used ore from the Mesaba range.

The high grade concentrated iron ore is produced from an open pit area in Iron Mountain and is processed in a concentration mill. It takes about two tons of crude ore to make one ton of concentrated ore with an analysis of 55 per cent or better in iron content.

Historically, recorded accounts concerning Iron Mountain go back 150 years to the latter part of the eighteenth century when the Spanish government deeded 16,000 acres of the area as a gift to one Joseph Pratte who seemed to have gained quite a reputation for maintaining the peace between white men and the Indians who inhabited the region.

The property was first mined in 1844, and the first furnace for the manufacture of iron "blooms" was built at the mine in 1846, followed by a second in 1848.

Other furnaces were built in 1851 two and one-half miles east of Farm-

ington, Mo., and ore from the Iron Mountain mine was hauled to this furnace by oxen and mule teams. Iron from these furnaces also was hauled by oxen and mules over a plank road to packet boats on the Mississippi River at Ste. Genevieve, Mo.

The St. Louis, Iron Mountain and Southern Railroad, now a part of the Missouri Pacific Lines, was built in 1858 from St. Louis to Pilot Knob, Mo., the road running through the Iron Mountain property.

During its history the mine has passed through a succession of ownerships until the Hanna Company became interested in 1927 and furnished funds for further exploration work. As a result additional ore bodies were discovered which had escaped the attention of previous operators through more than 100 years. Now there is believed to be enough ore suitable for commercial production to provide many years of operation, as proved by the extensive exploration of the company.

Before the Hanna Company became interested in the property there was practically no mining in the Iron Mountain area between 1907 and 1922, when operations again were started but lasted only a few years.

Production of ore from Iron Mountain mine since its inception is approximately 5,000,000 tons. During this period only the ore of high iron content was mined on the property. At one time there was a vein of almost pure ore 40 feet thick that ran nearly 300 feet down. The remaining lower grade ores have to be processed by an intricate mill operation to raise the iron content and make a commercial product.

Officers of Ozark Ore Company are Joseph H. Thompson, president; H. L. Pierce, executive vice-president; C. N. Hickok, vice-president, all with offices in Cleveland; E. E. Huner, general manager, Duluth, Minn.; G. M. Cannon, assistant general manager, Iron River, Mich.; W. E. Dewald, superintendent, Iron Mountain, Mo.

Munitions Production Level in October On Par With September

Washington

• • • The monthly munitions report issued by the War Production Board for October indicates a total dollar volume of \$5,240,000,000 virtually the same as September. Production missed the first of the month schedule by 2 per cent, without considering later revisions made in the schedule.

Not one of the major categories of combat munitions met its October 1 schedule. October output of guns and fire control equipment and combat and motor vehicles each registered a 4 per cent gain over September. Ammunition and ships just about held their own as compared with September. Communication and electronic equipment was up 5 per cent over September, but still was 6 per cent below the steeply rising October schedule.

As a group, the "critical programs" of the entire war production gained 6 per cent over September output. The increases ranged from small to sizable: communication wire, up 10 per cent; heavy-heavy trucks and cotton duck, up 13 per cent; general purpose and fragmentation bombs, up 11 per cent; tanks, up 20 per cent. In spite of the October gains, the critical programs must still improve much more than they did if the armed forces are

to get all of the critical supplies called for in their stated requirements, WPB said. For example, a rise of 55 per cent over the October rate is required in November and December for army heavy artillery ammunition to meet the 1944 stated requirements; and even this goal is below computed strategic requirements.

Among the programs that are currently behind schedule are heavy bombers, heavy ammunition and artillery, heavy trucks and tires, assault transports and assault cargo ships, radar equipment, cotton duck for tents, and spare parts for the fleet. There is no one reason why these programs are lagging behind production goals, and there is no single solution to the problem of getting them up to schedule, WPB said.

During October, the Maritime Commission delivered 145 ships with a deadweight tonnage of 1,310,000 tons. In dollar value, delivery of Maritime Commission vessels in October reached its highest point this year. The all-time peak in number and value was December, 1943, when 208 ships were delivered by the Maritime Commission.

There were 53 military-type ships completed in October. The important increase was the 50 per cent rise over September output in combat loader deliveries to the Navy. Despite this big rise, however, deliveries have been running behind Navy needs.



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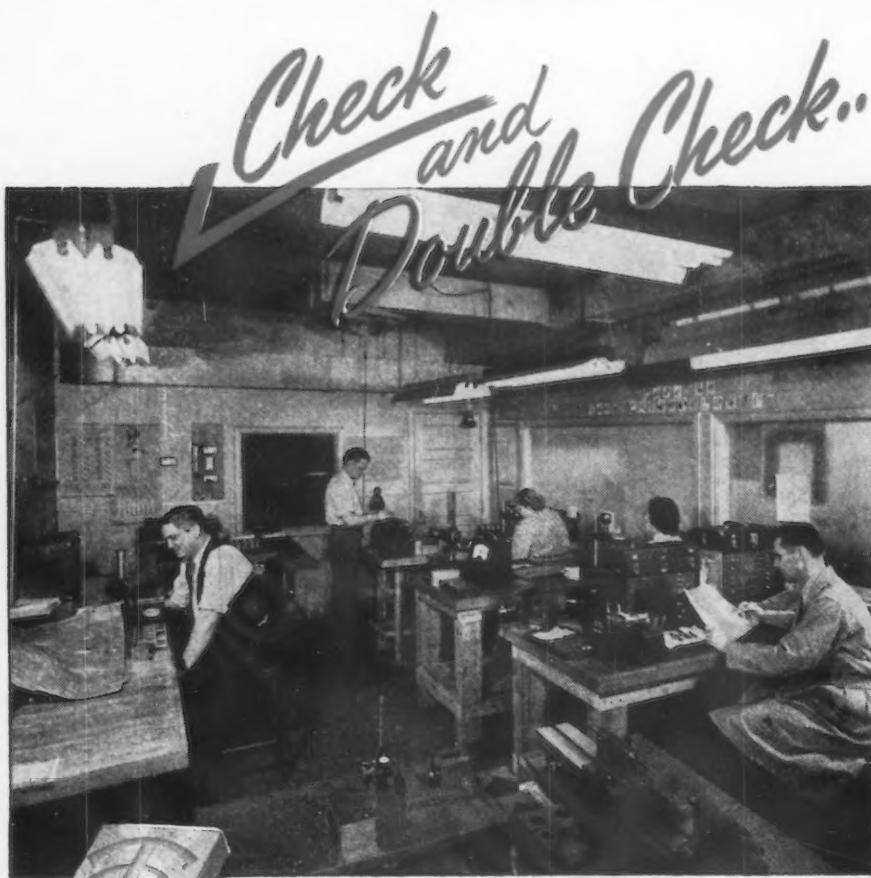
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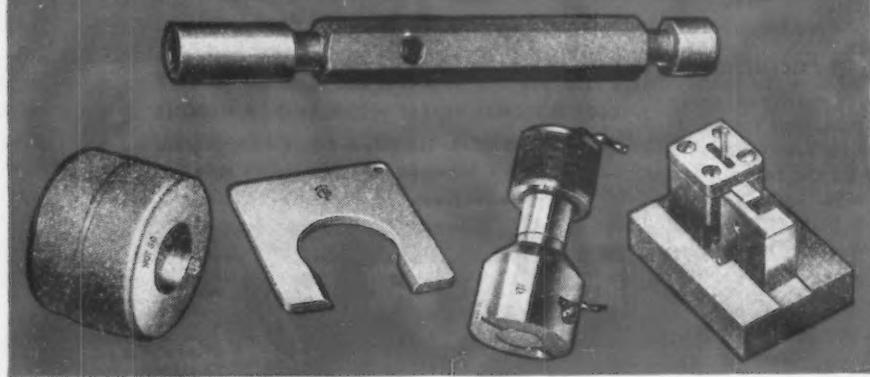
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SAE Annual Meeting Program to Cover War Requirements

New York

• • • Wartime automotive engineering needs are covered in the program for the 1945 Annual Meeting of the Society of Automotive Engineers to be held at Detroit, Jan. 8-12, 1945.



C. F. Kettering

Outstanding wartime engineering papers to be presented at the meeting in the Book - Cadillac Hotel, include reviews of the contributions of industry to Ordnance tank-automotive engineering and of the metallurgy of enemy automotive equipment. These papers are to be presented by Col. John M. Colby and Col. J. H. Frye, both of Office Chief of Ordnance, Washington, D. C.

Numerous other papers will be concerned with wartime automotive engineering developments, including water-alcohol injection, heated wings for aircraft, methods for calculating torsional vibration, induction heat treatment of internal surfaces, trends in airport design, and basic factors of helicopter design.

A portion of the program will be devoted to postwar application of wartime engineering progress, with C. F. Kettering, of General Motors Research Laboratories Division, speaking on "Fuels and Engines for Higher Power and Better Efficiency."

Three postwar symposiums have been organized for the meeting. A symposium on body designs for postwar automobiles will present four newspaper automobile editors outlining needs as indicated by users. The editors are: Bert Pierce, of *The New York Times*; H. D. Wilson, of *Chicago Herald-American*; G. R. Hebert, of *New Orleans Times-Picayune*, and John Burke, of *San Francisco Examiner*.

A symposium on postwar local air transport will present representatives of aircraft manufacturers and operators and of other business enterprises discussing the type of planes required. The third symposium, concerned with aircraft cockpit engineering, is de-



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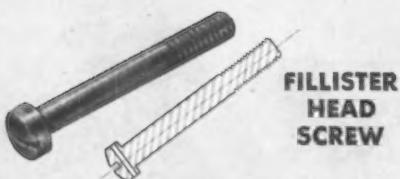
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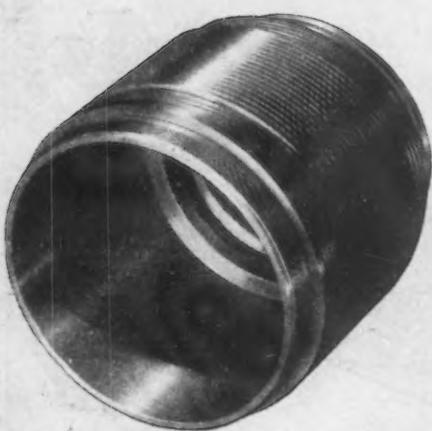
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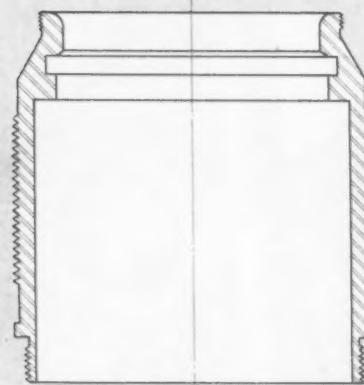


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signed to produce data on ways and means of equipping the plane's control center for the most convenient and efficient operation.

A substantial proportion of the program is given over to technical papers on processing and applications of automotive materials, such as synthetic rubber, fabrics, and steel. Aircraft Sessions will present papers on electronic controls, hydraulic braking systems, and related subjects. Sessions concerned with the engineering of land vehicles will present technical papers on cold starting, multiple power plants for trucks and buses, power steering, and diesel engines.

Considerable time on the program will be devoted to standardization in the manufacture of both land and air vehicles.

Adequate Supply Of Industrial Diamonds Seen for Essentials

Washington

• • • An adequate United States supply of industrial diamonds is assured for essential uses during the first half of 1945 through an accord reached with the British Ministry of Supply. S. W. Hofman, Chief of the WPB Diamond Section of the Miscellaneous Minerals Division, said recently.

Mr. Hofman, recently returned from London, said that the supply of industrial diamonds available during the first six months of 1945 for American use would be in amounts comparable to the 1944 rate. He emphasized that the purpose of his recent trip was solely to make arrangements for a continuity of supply, as and when needed.

While supply and demand were in some degree of balance, the WPB spokesman said, industrial diamond users were advised to confine their purchases where possible to the broad requirements for the jobs to be done rather than to critical specifications of type, size, and shape when not essential.

Hofman disclosed that on certain types of rough industrial diamonds not as plentiful as others the British Ministry of Supply indicated that it would explore the possibility of increasing the supply or developing new methods of separation at the mines and from other assortments. However, the ministry could not promise definite results, he said. American industrial diamond needs would be reviewed again in the middle of 1945 unless war developments prompted earlier action, Mr. Hofman stated.



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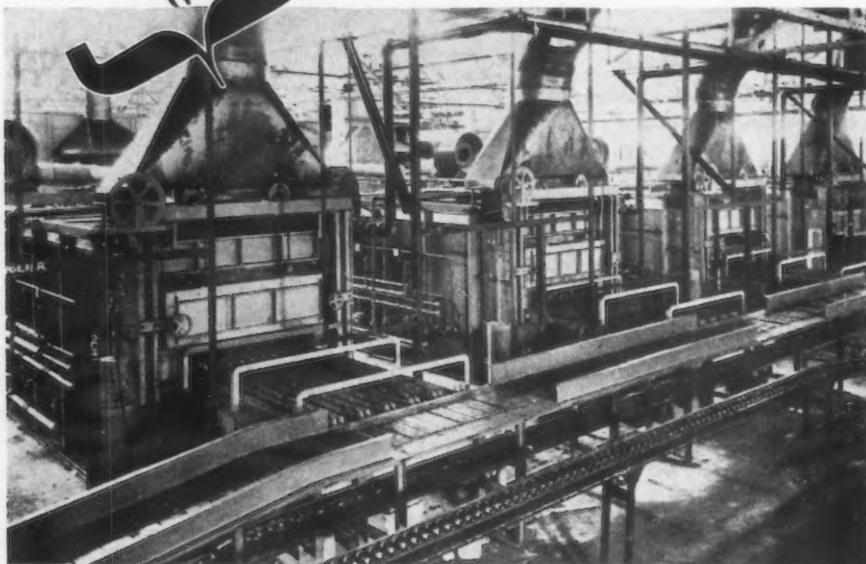


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BUY WAR BONDS

Sample of 125 Small Metal Working Firms Bodes Ill for Future

New York

• • • Many small companies that are now heavily engaged in war work are in such a precarious financial position that they may succumb to relatively minor jolts resulting from cutbacks, renegotiation, termination, and discounting of inventory, even before they are confronted with the difficult problems of financing reconversion to the production and marketing of peacetime goods. This is the situation revealed by a detailed analysis of the balance sheets of 125 small war industries just completed by the research staff of the National Industrial Conference Board.

At the end of 1943 these small corporations possessed working capital sufficient to cover only 17.2 per cent of current liabilities, while 25 of them with net worth below \$100,000 had working capital of only 7.3 per cent of current liabilities.

For this same group of 25 very small concerns, working capital amounted to only 13.4 per cent of inventory, so that if only that small part of their current assets tied up in inventory could not be realized or became frozen, their working capital would disappear altogether. Working capital of the 125 concerns combined amounted to 32.9 per cent of inventory.

Small business, it is pointed out, has traditionally had a lower ratio of current assets to current liabilities than the larger enterprise, hence a smaller margin of safety in its current position, and even in pre-war years its working-capital position appeared to be growing less favorable as compared with that of the larger enterprise.

Very little is known about the impact of the war program on these little businesses, or about their ability to meet their financial problems in the reconversion period, because their balance-sheet and operating statements are not readily available in the standard financial manuals or in SEC releases. Deterioration in the working capital position of small business has been assumed and given great weight in Congressional and other discussion aimed at providing government aid. The conference board's study of the financial position of small metal-working corporations is called a beginning to

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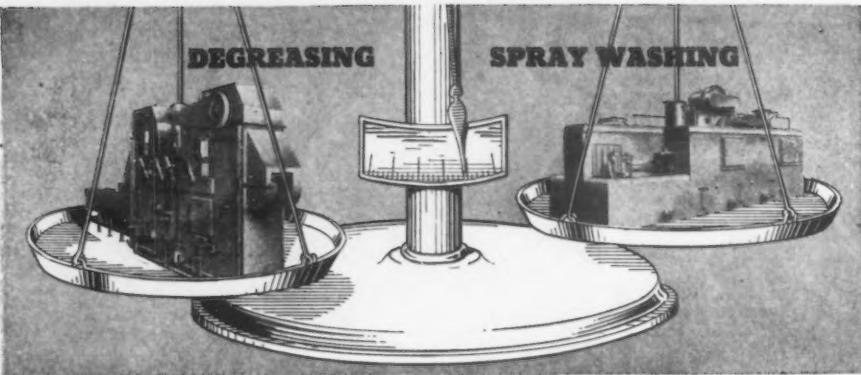
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NEWS OF INDUSTRY

ward filing the void of factual information.

For the purpose of the study, net worth was selected as the best measure of size, and the term "small" was applied to corporations with net worth up to \$1,000,000. The selection of the 125 concerns was made on an impartial basis from credit files by five men who were not aware of the final use that was to be made of the sample. "War babies," or companies not in existence before the war, were excluded. The sample included five equal groups according to net worth: less than \$100,000; \$100,000-\$250,000; \$250,000-\$500,000; \$500,000-\$750,000; and \$750,000-\$1,000,000. Their credit rating was well above average.

Before the war these 125 companies were engaged in manufacturing radio parts, washing machines, aircraft parts, auto bodies, stoves and furnaces, small tools, etc. When peace comes, some of these companies will face a serious job of reconversion, of switching to the fabrication of their normal peacetime products, of re-establishing distributive channels and of rebuilding markets lost as a result of the war.

"Analysis of their present position," says the report, "suggests that few will be financially prepared to make the transition to peacetime production. The drain on their cash resources, it seems, will place many of them in a precarious financial position.

"The ratio of current assets to current liabilities is dangerously low for all size classes. The range in the ratio of current assets to current liabilities was from a low of 1.07 for those companies with net worth of less than \$100,000 to a high of 1.29 for those with a net worth of \$250,000 to \$500,000. Cash and securities, the most immediate means of meeting current liabilities, amounted to only 28 per cent of current liabilities for all groups combined.

"While such a situation need not spell disaster, it does require a fine balancing of cash income and cash outgo. A slight miscalculation in estimating the magnitude or in timing of cash receipts could very easily involve these companies in difficulty.

"In returning to normal operations, the outflow of cash in the critical interval will most likely exceed the inflow. Raw material inventories will in many instances have to be built up, wages paid, quarterly payments of

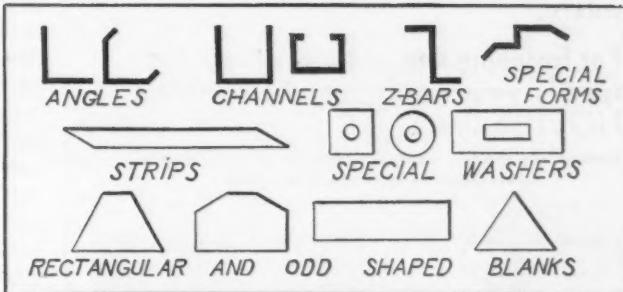
SOLVE POST-WAR PRODUCTION PROBLEMS WITH

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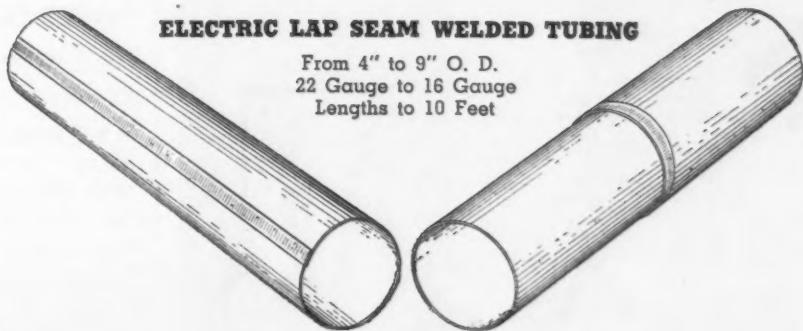
20 years of peacetime production coupled with 3 years of accelerated war production has given our company the "know how" to manufacture your peacetime sheet metal parts on a competitive basis. For complete satisfaction call on Harrison.

Our facilities include equipment not found in average steel fabricating plants — electric seam welders, automatic arc welding heads for continuous line arc welding and a completely conveyorized setup for degreasing, washing, rust-proofing, enameling and baking.



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From 4" to 9" O. D.
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1/4" Capacity — 12 Feet Long.

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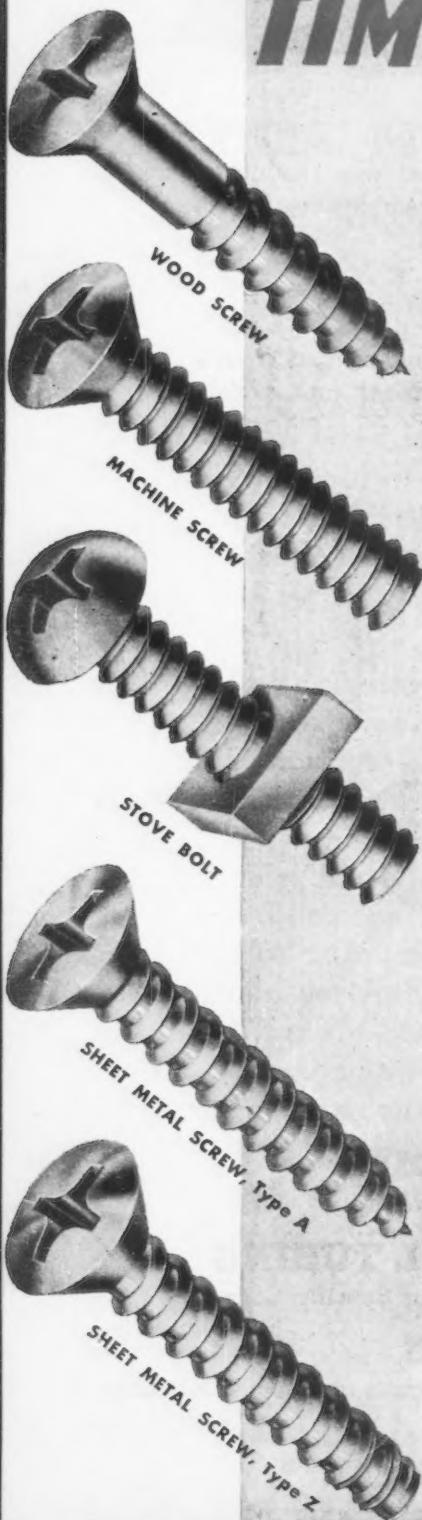
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RECESSED HEAD SCREWS and BOLTS

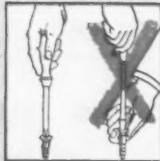
SAVE 50% FASTENING TIME and COSTS



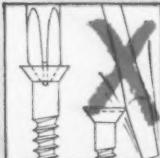
Start at the heart of your assembling to cut costs and boost production. Replace old screw driving methods with HOLTITE-Phillips Screws, Bolts and allied fastenings. Replace slow, hazardous hand driving with safe spiral or power driving, even on finished parts. Women and green hands can power drive HOLTITE-Phillips fastenings with speed and safety.

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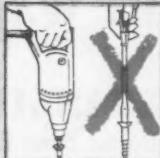
Wartime conservation makes it impossible to send catalogs unless requested on company letterhead.



One hand driving.
Other hand free
to hold or steady
work. Time saver.



Driver or bit can
not slip to mar
finished work or
injure workman.



Faster methods of
driving with safety.
Driver cannot jump
from recess.



NEWS OF INDUSTRY

the huge income-tax accruals made, and expenses incurred in reestablishing distributive channels and rebuilding markets."

For the 125 companies combined, working capital was 32.9 per cent of inventory. If the inventory is unsuitable for use in the production of peacetime goods it would have to be converted into cash either by reimbursement from the government or through T-loans. If realization on this inventory should be 32.9 per cent short of book value, or 13.4 short in the case of the 25 smallest companies, working capital would disappear entirely.

Finally, the study draws attention to the probability that small industry will need far more working capital than barely sufficed before the war. This probability arises from the general agreement that full employment after the war will be dependent upon a national income of at least \$140,000,000,000, as against the Department of Commerce estimate of \$96,900,000,000 in 1941. If small business is to make its contribution to full employment through greater production, its need of working capital for equipment, materials, wages and marketing expenses would naturally be much greater than in 1941.

NWLB Denies Petitions To Review Regional Findings

Chicago

• • • Petition by International Harvester Co. for review of a Regional War Labor Board ruling of June 29, has been denied by the National War Labor Board in a case affecting 3000 workers of the company's West Pullman works. The regional board ordered submission to final and binding arbitration a dispute with United Farm Equipment and Metal Workers of America, local 107, CIO. Industry members dissented from the ruling.

In another national board ruling affecting a local firm, denial was made of a petition by Taylor Forge & Pipe Works, Chicago, for review on a non-wage issue and a regional board order was upheld. The order directed standard maintenance of membership, with 15 day escape period, and check-off of union dues by the company. Grievance procedure ending in final and binding arbitration was ordered. The union Approximately 1900 workers were affected. Works Employees Assn., independent, involved was Taylor Forge & Pipe

CONTINENTAL SCREW CO.

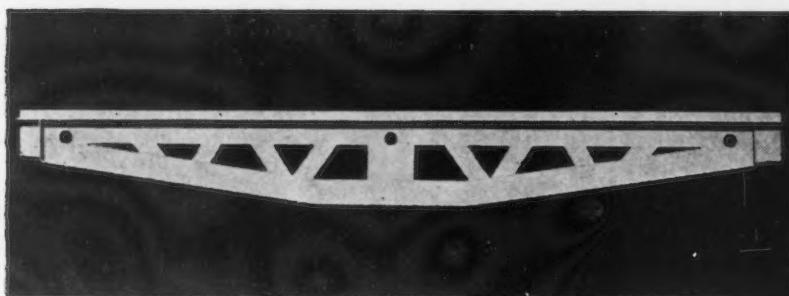
New Bedford, Mass., U.S.A.
BUY MORE BONDS



ARC WELDING

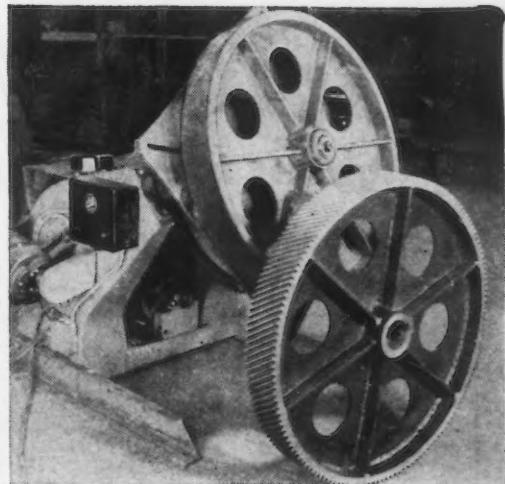
HIGHLIGHTS

BETTER DELIVERIES of electrodes are the order of the day, thanks to the current higher output of manufacturers, and to the curtailment of certain parts of the war production program. The latest production figures reveal that almost 65% more mild steel, coated electrodes were produced in the first eleven months of 1943 than in the corresponding period the previous year. Deliveries now generally may be made in weeks instead of months; and certain types of electrodes can be shipped immediately. However, fabricators should continue to order as far ahead as possible, as this enables electrode manufacturers to anticipate and meet the specific demands for various types.



HATCH SHIFTING BEAM saves ten tons of steel per ship. Twenty feet long, weighing 1,125 pounds, these beams are produced in quantity by the Globe Company of Chicago. Welding is done in ten specially designed fixtures, each of which aligns and holds parts in position as they are welded. Quarter-inch reverse polarity rods are used for welding the lacings and gussets and $\frac{7}{32}$ " Murex Type FHP for the intermittent fillet welds that attach the long plate to the top of each beam.

THE ELECTRIC MACHINERY MANUFACTURING COMPANY of Minneapolis, a leading designer and manufacturer of synchronous motors, reports that arc welding has taken the place of cast construction in pedestal bearings, stator frames, and bases. Welding approximately halves weight; produces greater rigidity and sturdiness; permits variations of design at small cost. Overall savings are estimated at more than 30%.



ARC WELDING IS A 50% TIME-SAVER as compared with casting in the fabrication of heavy gear blanks, according to the Ransome Concrete Machinery Company, Dunellen, New Jersey. Murex Types F and FHP "hot" rods used at high currents permit rapid deposition of weld metal and result in smooth, uniform welds of great strength.

SPHERICAL ANTI-SUBMARINE NET FLOATS by the thousands are built by Brown Steel Tank Co., Minneapolis. Each float is fabricated from six segments of $\frac{3}{16}$ inch steel plate. Positioners are used. Welds are made from the outside, using $\frac{1}{4}$ " Murex Fillex electrodes. These floats withstand salt water submergence tests to a depth of 250 feet.



MUREX ARC WELDING ELECTRODES

METAL & THERMIT
CORPORATION

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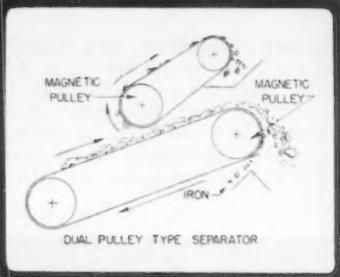
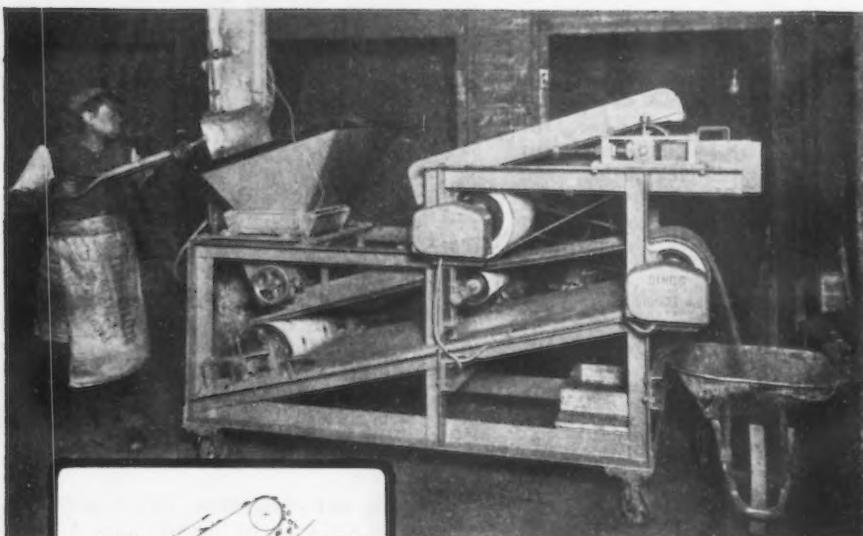
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against iron in non-ferrous scrap



Dings type DA separator for separating brass borings and turnings.

No chance for iron to get through here. If it's not picked up by the first magnetic pulley, the second one gets it.

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When you run non-ferrous scrap through the Dings Magnetic DA Separator, you can be sure that it will come out iron-free. This machine combines two high-intensity magnetic pulleys. The first lifts the iron off the top, and the second catches any iron which the first might have missed because it was buried on the bottom. This portable, self-contained unit is double protection against unwanted iron in non-ferrous scrap.

Whatever your requirements . . . removing iron from foundry sand, reclaiming iron and steel from slag, separating ferrous and non-ferrous scrap . . . there is a Dings High Intensity Magnetic Separator that will fit your job. Write for catalog No. 250 which gives complete details.

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Extremely powerful Alnico horseshoe magnet for laboratories, smelters, refiners, etc. Measures $2\frac{1}{2}$ " high by 3" wide. Pole bases $\frac{3}{4}$ " x $\frac{3}{4}$ ". Prices on request.

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SEPARATION
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NEWS OF INDUSTRY

United States Steel Leader Decries Tax On Corporate Income

Chicago

• • • Hitting at the corporation income tax as a concealed sales tax and characterizing certain new tax proposals as "mathematical abstractions," Enders M. Voorhees, chairman of the Finance Committee of the United States Steel Corp., said at the annual dinner of the Illinois Manufacturers' Association here recently that taxes and regulations were setting back the moral clock and inducing "the moral degeneration of evasion."



Enders M. Voorhees

He warned that, unless taxes be examined and weighed in the light of experience, we shall find ourselves protecting inefficiency and curtailing initiative. "If, through taxation or otherwise, we penalize those who undertake to produce and serve, there will be fewer jobs to be done and we shall present to the returning soldier a land of decreasing and not of increasing opportunity. We cannot promote our production by squelching ourselves as customers."

The fiscal problem, said Mr. Voorhees, "gets down to paying taxes and still leaving to us the means and the will to bring jobs into being. The government, as a customer, as an employer, as a price and wage fixer, as a money lender and as a subsidizer, appears to have so changed the business picture that it is easy to forget that the real level of our material existence must depend on how well we serve each other—that we lead a dual life as producers and customers, exchanging with each other as producers and customers."

"As customers, we dominate ourselves as producers, and, although what we call the government has dominated through these war years as a customer, the government is only our collective selves. The relation may be expressed in dollar symbols but basically it will not be changed. If we add to the costs of production, we must add to the cost of consumption—



The voice of BRASS has always called: "Come One, Come All!"

THE welcome uproar of the old dinner bell . . . the polite summons of door bells and chimes . . . the blare of bugles and the vibrant tones of the great symphony orchestras . . . in all these you have always heard the speaking voice of Brass. For Brass is the finest of all sound-conductors, with its resonance always true-toned from a whisper to a shout. And it is readily formed into all manner of intricate shapes, yet it has the

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have been rolled out for naval anti-aircraft shells. Now, Bristol would welcome the chance to discuss the uses of Brass in your future plans.

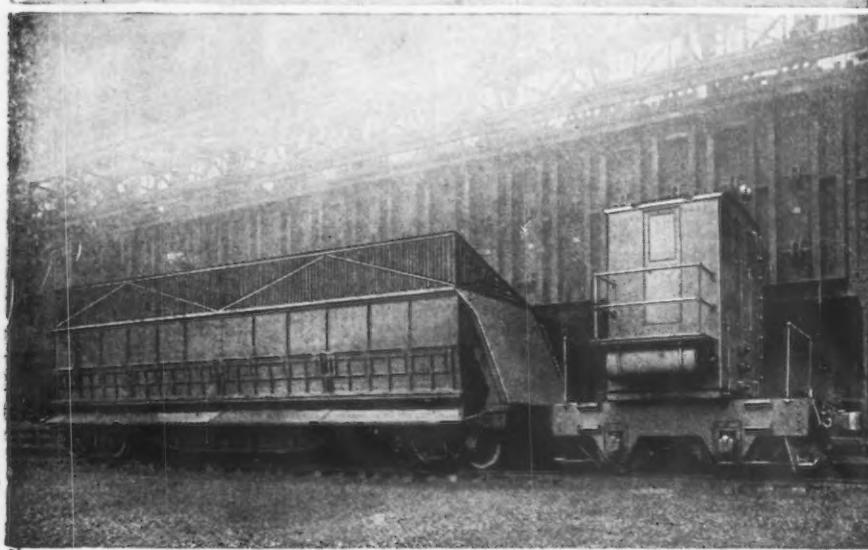


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or to put it another way, if as customers we insist on getting something for nothing, then as producers we must find ways of giving something for nothing. There is, I regret to say between production and consumption no twilight zone where good fairies play. It is as simple as that—and there are no exceptions."

The right to earn and to own, declared Mr. Voorhees, is a moral right and "it is a moral issue as to how the right to earn, to own and to spend shall be circumscribed. As customers, we select who gives the best and the most for our money—the package bought may be your service or my service, a ton of steel or a bag of potatoes. Thereby the customer elects who will earn most and own most. The exceptions are negligible. If it be immoral for one to earn or to own beyond a certain amount—that is, to serve the customer beyond a certain amount—then it is wholly immoral for the State to celebrate each year by taking away the excess of earnings or ownings above the sin line. The moral way would be to prevent a man from sinning by preventing him from serving. The State should not live on the wages of sin."

Touching the tax plans which assume that the government should prevent our saving and also create national income, Mr. Voorhees said: "I am, of course, entirely familiar with the contention that progressive income taxes mainly take what customers would save rather than spend directly for goods and services.

"That contention takes us into a miasma of belief that we do know how much men save, that saving beyond a point is anti-social, and that therefore both saving and investment should be regulated and hence some bureau and not the individual should decide if, how and when the customers are to have more and better goods. The contention seems to support a tax theory. But tracked down it becomes a social theory of untested validity.

"I suggest to you that our big job right now is to discover what customer power the government can take from us and still leave us enough to support ourselves as producers. Let us think in terms of customers. Approaching from this angle, how can one subscribe to any of the plans which start out by projecting a national income which can be taxed to meet any government expenditure? Such a projection presupposes that the national income will be whatever we want it to be.

"That smells to me like our old

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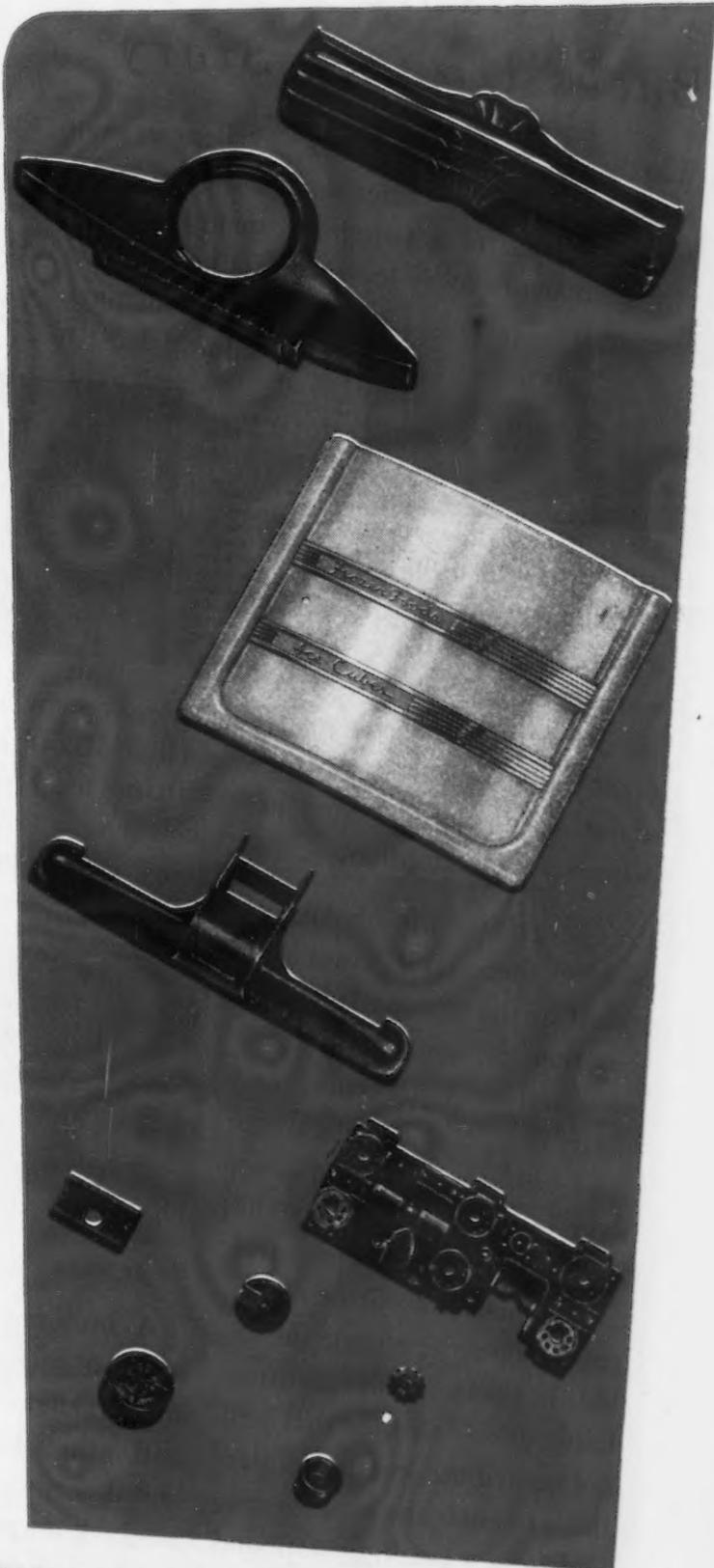
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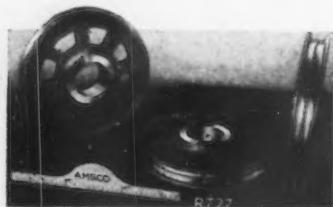
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Your Cable Manufacturer Backs Up Our Story

Whether an Amsco manganese steel sheave is used under water at the end of a swinging dredge boom or away top-side



R-727 Double groove sheaves for a steel plant ladle crane hoist.

an oil well drilling derrick makes no difference. It will resist wear and breakage far better than a sheave made of any other steel and bring about a substantial saving in wire rope consumption.

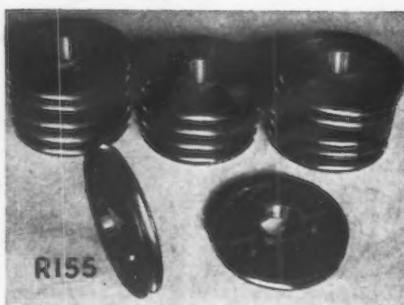
The greater life of Amsco sheaves themselves comes as a result of the unequalled combination of strength, toughness and work-hardening capacity in austenitic manganese steel; and the saving in cable wear is brought about by the fact that a manganese steel groove does not cut or corrugate to pinch or abrade the cable; but does acquire an ultra-hard, glassy surface that will not contribute small steel particles to enter the rope strands and form a cutting compound with the lubricant.

Bear in mind, though, that these properties of austenitic manganese steel will not be found in like degree in so-called manganese steel containing 1.50 to 2.00% man-



R-517 Grinding sheave grooves to a radius gauge at our Chicago Heights plant. Amsco's method of machine finish assures uniform dimensions and groove concentricity with bore.

ganese, or some other amount less than 10.00%. To identify genuine manganese steel, touch it with a magnet—it is almost completely non-magnetic.



R-155 Sheaves for use on boring mill heads.

A bulletin, No. 842-WS, sent on request, tells more about manganese steel sheaves and other kinds of wheels and describes the painstaking methods employed in Amsco's machine shops.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

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NEWS OF INDUSTRY

friend the managed economy, which I thought was still down the well into which it fell some years ago while struggling to prime the pump. If I were blowing national income bubbles, I would blow a whopping big one—say, five hundred billions a year—and show how the national debt could be paid off and the government run by a tax on brown shoe laces.

"Since any fiscal plan which includes deficit financing in peace is not a plan at all, but an acknowledgment of an inability to plan, the absolute limit of effective national expenditure is the amount that we can transfer to government without destroying the desire of the individual to earn more. If the desire to earn more be smothered, the tax becomes self-defeating, in that its yield will gradually diminish. This cuts customer power and, in our present vernacular, it means fewer jobs."

Turning to the corporation income tax, Mr. Voorhees developed that it was not what it was supposed to be, but instead a tax which everyone paid in the price of good but which only the efficient producers turned over to the government. The effect is to protect inefficiency, unbalance prices and generally disrupt the economy.

"In the long run," said Mr. Voorhees, "under competition, the most efficient producer—that is, the man with the lowest cost—is the one who attracts the customers. His price is the one at which other producers must sell. Thus all customers of all producers pay a price which includes the income tax of the low-cost producers.

"But only the low-cost producers turn over to the government the taxes they collect. The less efficient keep what they collect. This in effect is a subsidy. The customers by paying that price, which includes the tax of the low-cost producer, provide a cost umbrella to the less efficient producer. The higher the tax the bigger the umbrella. The high-cost producer could not meet the low-cost producer's prices based on manufacturing costs. The income tax clears a cost area for him to absorb his other higher costs.

"The customer may, if he be able and willing, pay the tax cost directly in higher prices, or, if he be neither able nor willing directly to pay the higher prices, he will in the long run pay for them indirectly through the chaos of stagnation with all that means in the way of unemployment. For, if wages to owners cannot be covered in price, the provision of new tools will waste away until a smaller output will command the higher price.

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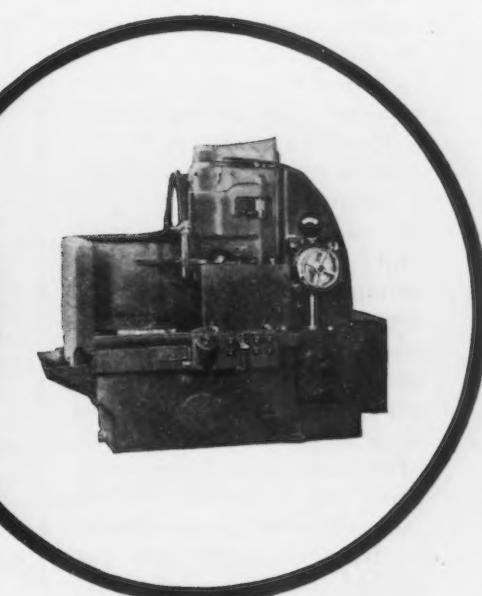
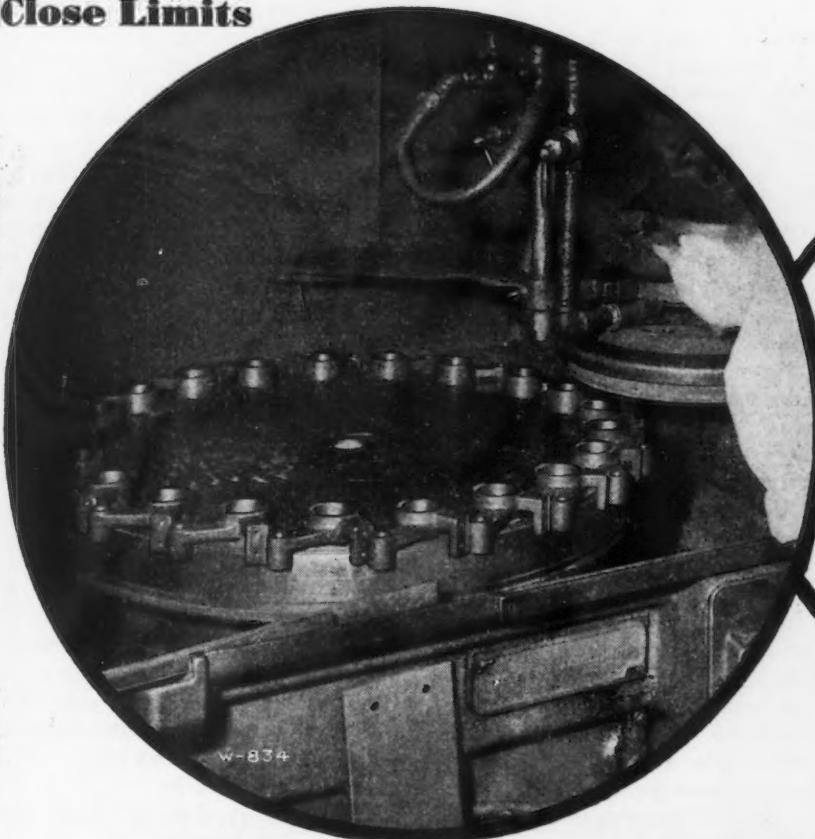
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Twenty-one pieces are placed on the chuck at one time and two loads or thirty-two pieces are ground per hour, removing $\frac{3}{16}$ " of metal.



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If the customer as a producer cannot exchange his products, he ceases to be a customer—if he can't sell he can't buy.

"That is what I am afraid we are going to meet if we carry high income taxes over into peacetime competition without a full realization of what they are and what they do.

"The sheltering of the inefficient prevails at every stage of production and distribution from first producer to final customer, and the finished article reaches the ultimate customer at a price which includes some sort of pyramid of all tax costs and subsidies. But since all articles do not go through the same number of stages on the way to the customer, some have more costs and subsidies added to their prices than others. Thus there is brought about an unbalancing of general price relations by government tax edict.

"The exact extent is unknown, but I should not be at all surprised if part of the trouble that farmers have in exchanging their products for adequate quantities of manufactured products is due to the pyramiding of subsidized inefficiency that is the result of the corporate income tax."

The further effect of the tax, Mr. Voorhees asserted, is to prevent little business concerns from starting up and to strangle small business which is not already well established, thus concentrating business in the older companies. "These businesses," he said, "even under the best circumstances, can accumulate only small reserves. With present taxes they cannot, even without paying anything to their owners, put themselves in shape to finance much adversity. That is, they have received death sentences and only the dates of execution remain in doubt. This gives an advantage to corporations that had become well established before the heavy rates went into effect.

They can live for a while by eating the substance which they should use to provide more and better goods and services at lower prices. This makes for the gradual concentration of business in the existing corporations, regardless of their efficiency, and therefore for a kind of involuntary monopoly. It would be significant indeed if we could find a method of discovering the extent to which law is forcing the concentration of business. What we are having is something in the nature of a freezing process in which big business, because of its bulk, takes the longest to die."

Taking U. S. Steel as an example,

Mr. Voorhees said that with present prices, if current costs were applied to the years 1936-39 which the government has taken as normal, U. S. Steel would lose \$75 million a year and that to cover the loss, pay taxes and continue the present dividends the managers would have to find \$175 million a year. Management, he said, "would be forced to try to get these costs back out of increased prices. You will observe that I say 'try.' The customers fix the prices. The notion that a corporation can set prices as it likes and still get business is not in accord with the facts.

"There are some who hold the theory that the volume in postwar years will so expand that no increase in price will be necessary. In the so-called normal 1936-39 period we sold an average of 11 million tons of steel. Present prices on peacetime steel products are about what they averaged a year in that period. Without paying any return to the owners or income taxes to government, customers would have to buy at these prices, to cover operating costs alone, more than 16 million tons of steel—or one-third more than our long-term average of 12 million tons.

"In only one year not influenced by World War I or II did our customers buy as much as 16 million tons. With present prices and costs it would be impossible for us to produce the peacetime goods that would be necessary to pay an assumed 40 per cent Federal income tax and the present return to the owners. Planning on the basis of theory is not a substitute for preparing on the basis of experience."

Asking for a completely new tax set-up based on experience, Mr. Voorhees concluded: "We get exactly nowhere by talking about specific sections of the current revenue law. It is impossible to exempt any group or section of our people from taxes without penalizing the others to the point of destruction. The day of assessing taxes on this group or that according to the volume of squawk should have passed—although a lot of people do not yet know it. Government should no longer play taxes by ear."

"In my view, the preliminary to a moral and therefore workable tax plan lies not in projecting a dollar income to cover the cost of sustaining government in the style to which it has accustomed itself, but rather in the careful examination of our economy to learn how and what part of our goods and services can be turned over to government and still leave us able to promote real human progress."

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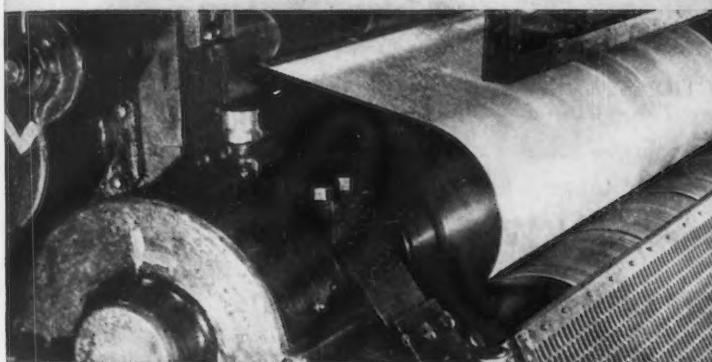
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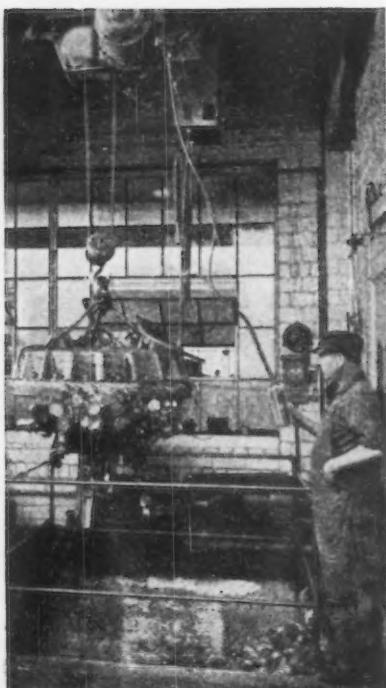
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STEEL**



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Monarch Machine Tool Co. gets fast handling of chips and shavings from briquetting machine to bins or truck with a Stearns Lifting Magnet.

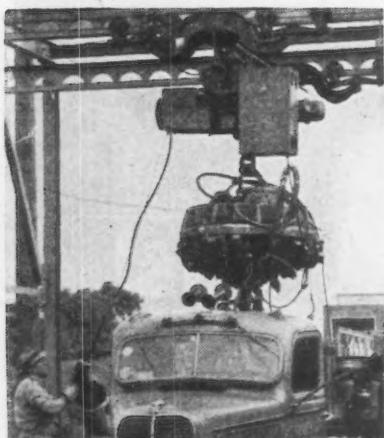
Only one of many jobs efficiently and economically done by Stearns Magnets. You may have a similar problem in which we can be of definitely profitable assistance.

For moving material quickly at low cost, saving hand labor on difficult and dangerous operations, increasing storage capacities—install a dependable, sturdy Stearns Magnet.

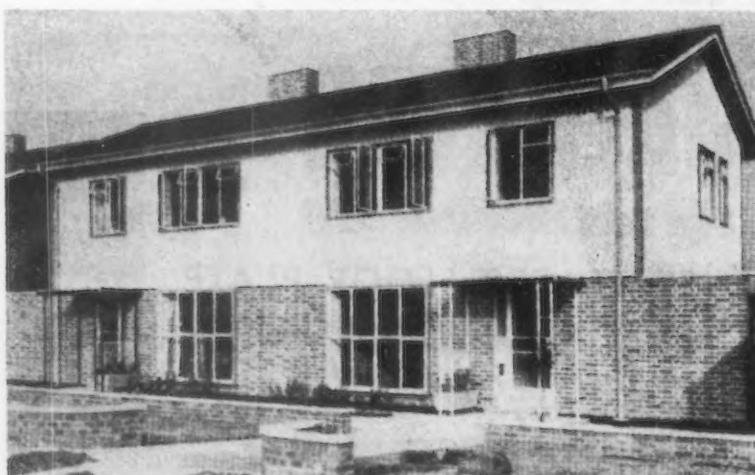
Write for our Bulletin 35.

STEARNS MAGNETIC MFG. CO.

635 S. 28th Street Milwaukee 4, Wis.
SEPARATORS • CLUTCHES • BRAKES



NEWS OF INDUSTRY



UNIT CONSTRUCTION: This General View shows two of the "A" type houses after completion. The external cladding is $4\frac{1}{2}$ inch facing brick over the hot rolled framework.

British Experiment With Steel Construction on Housing Programs

• • • Prime subject of interest to British industrialists as well as citizens is housing, what will be done to shelter the population bombed out and what will be done after the war for permanent housing. The Ministry of Works has taken over a site at Northolt for demonstration building projects to test materials, methods of construction, and to study the number of site man hours required for different types.

The demonstration project is a direct result of the known inadequacy of traditional building methods to meet the emergency situation. In addition to brick houses, the ministry has shown work in foamed slag, concrete, and expanded clay.

The British journal, *Sheet Metal Industries*, in describing the project, says:

The problem of building acceptable houses in steel is not easy, since it involves an entirely new conception of construction capable of supplementing and finally competing with the normal house-building practice which has been brought to its present pitch of development after centuries of experience.

The initial investigations on framed structures are demonstrated in the four semi-detached houses built already. One pair has been built using a framework of hot rolled steel sections and the other pair using a framework of light-gage steel sections.

Alternative treatments of walls,

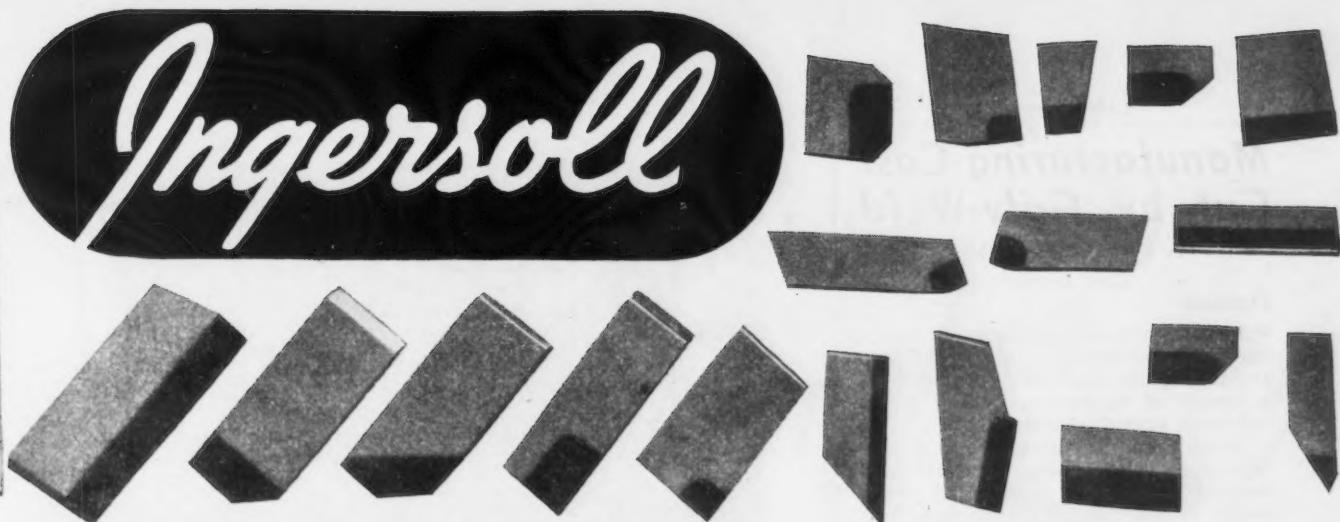
floors, ceilings, etc., have been included in order to test their relative merits in speedy and economical erection. The houses are therefore trial houses, and will be redesigned and modified until perfected.

These houses are being followed by other types, two of which are now in process of manufacture. One design is based on the experience gained in the trial houses and the other on a panel system which will still further reduce site labor.

The frame consists of a light hot rolled structural steel framework designed for rapid erection, the posts being spaced generally at 3 ft. 6 in. centers to take the standard metal window and its trim. The structure has a center trestle of tubular sections supporting the first floor rolled steel beams. For the roof, the construction features consist of steel trusses in rolled or tubular sections which support the steel ceiling joists, the roof covering being protected metal sheets on fibre board insulation.

The external cladding is a matter of choice. In this instance, the ground floor up to the head of the windows is carried out in a $4\frac{1}{2}$ -in. facing brick skin. About this level is attached vertical ribbed steel sheeting backed with fibre-board insulation. The inner wall leaf is of foamed slag or breeze concrete slabs, leaving a cavity in which the steel is accommodated.

It should be noted that the internal thermal insulation here and also elsewhere is generally well above that of



CARBIDE TIPPED CUTTERS



RAY BLADE



NEGATIVE ANGLE
FACE MILL



NEGATIVE ANGLE
SOLID SHANK



MEDIUM DUTY
FACE MILL



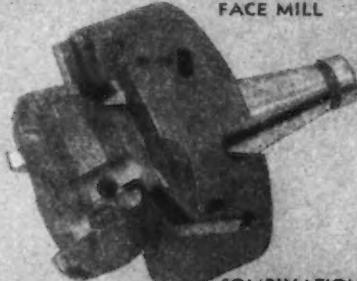
FULL SIDE MILL



HEAVY DUTY CONE TYPE
FACE MILL



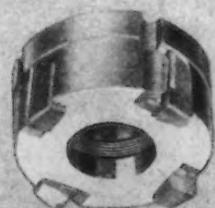
GERED TOOTH
SLOTTING



COMBINATION BORING,
CHAMFERING, FACING



TYPE RQ



CYLINDER BORING



SPAR CAP MILLING



NEGATIVE ANGLE
SLOTTING



Ingersoll specializes in the manufacture of carbide tipped cutters for milling and boring operations. The wide variety of standard Ingersoll designs covers most applications. Consult Ingersoll regarding increased production through use of carbide tipped milling and boring tools.

Ingersoll carbide tipped blades are copper brazed in atmosphere controlled furnaces to insure a strong uniform bond between tip and shank. Send your inquiries for replacement blades to Ingersoll. Note the many types illustrated above.

Send for Engineering Specification Sheets describing standard inserted blade cutters. Any of the designs may be furnished with carbide tipped, high speed steel, or cast alloy blades.



Manufacturing Cost Cut by Galv-Weld

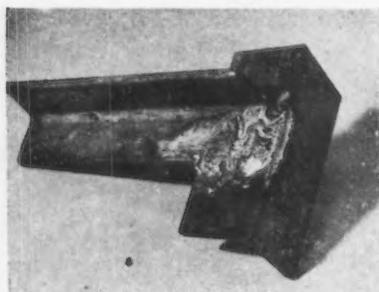
By GEORGE H. OHMER

Chief Engineer

Dayton

• • • Product design engineers working with galvanized sheet metal are acclaiming the Galv-Weld Process as a means of improving quality while lowering manufacturing cost.

Lower manufacturing cost is attained by abandoning the obsolete method of joining galvanized sheet metal by riveting and soldering, and replacing this laborious operation with welding which is considerably faster and more economical. The use of victory solder which stands very little abuse, also is eliminated.



ARC WELDED ANGLE IRON
showing how the weld and adjacent surface has been regalvanized.

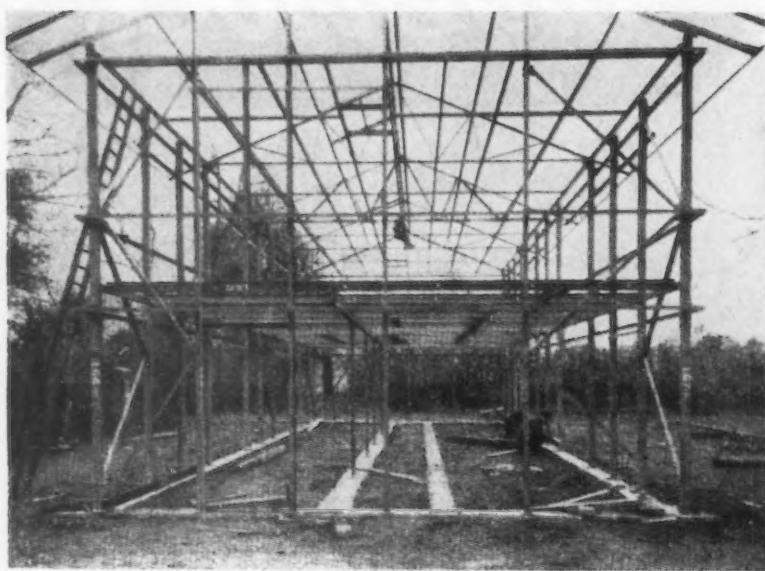
The welds are regalvanized with Galv-Weld Alloy at the time of welding by making use of the residual heat to melt or flow on the alloy. Welded seams are stronger, provide a leakless and vibrationless form of construction, while the Galv-Weld coating insures protection against rust and corrosion equal to and/or better than the original hot dip galvanizing.

Transmission towers are undergoing redesign to utilize welded rather than the conventional bolted type of construction. Made possible by the Galv-Weld Process, the welded tower offers combined advantages of greater strength, ease of erection and lower cost. New designs and greater durability in welded galvanized steel buildings for farm and industry are predicted with the extension of the use of this new regalvanizing process.

Regalvanizing with Galv-Weld Alloy is permanent; once applied the coating will not chip, peel or crack even when the base metal is stressed beyond its elastic limit. A comparison of Galv-Weld coatings with zinc sprayed coatings has conclusively proved that Galv-Weld is superior in all ways. It has a better bond, it will resist corrosion longer, it does not require sand or grit blasting, nor any special or expensive equipment for application.

Manufacturers are invited to submit samples of products for producing examples of how they can be Galv-Welded. There is no cost for this laboratory service.

Details may be secured from Galv-Weld Products, Dayton 10, Ohio.



STEEL FRAME: Experiments for frames of steel have included hot rolled and cold formed sections. Intensive effort is being made to reduce manhours required for the houses that must be built.

traditional brick construction. The partitions are of foamed slag or breeze slabs.

The first floor consists of steel joists with expanded metal above and below, the floor surface being of linoleum on 2 in. of concrete, and the ceiling of plaster.

The ground floor consists of 2-in. fine concrete on waterproof membrane supported by mass concrete on hardcore. The finish is colored asphalt.

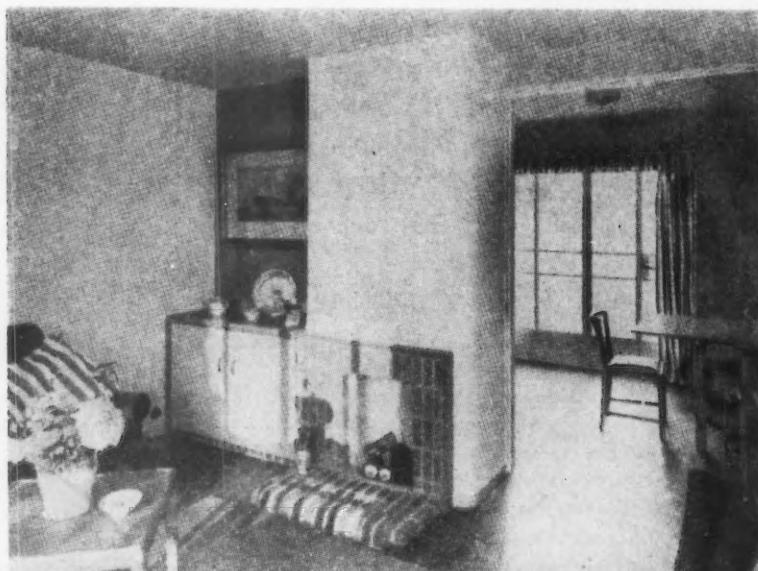
The party wall is of the cavity type, each leaf consisting of breeze concrete blocks; the floor steel and trestle is discontinuous.

Steel components used for the wind-

dows are standard metal sections secured in light-gage pressed steel sub-frames. The external doors are standard steel casement sections, except the side door, which is in pressed steel. Internal doors are of timber, and steel door frames are used throughout. The staircase is of spot welded pressed steel construction with wood treads. The skirtings are of steel trim.

Type "B" house consists of light-gage sections cold formed from mild steel strip fabricated by means of spot and ridge welding, the posts being spaced at 3 ft. 6 in. centers to take the standard metal window and

STEEL HOUSES: Government housing research in Britain is including extensive work using steel for frames, interiors and exteriors. The living room and dining annex of one house show the modern trend.





Embarrassed by

Surplus Inventory?

Sudden cancellations can leave you with tons of surplus steel, useless for peacetime operation. Why not eliminate the risk — use Frasse inventories instead?

Frasse stocks of cold finished bars, tubing, stainless steel, alloy and aircraft steels are ample. Tonnage has more than doubled to serve war needs. By using Frasse stocks as you go, you keep your own inventory *low* — escape dead surplus when cancellations and cutbacks occur.

No need to pile up your "surplus problem" with Frasse stocks handy. No need to wait, either, for steel when your reconversion starts. Frasse deliveries are *immediate* — can save you weeks, even months, in changing over. To plan quick reconversion, plan on quick steel — from Frasse.

Frasse Mechanical
and Aircraft Steels

COLD FINISHED CARBON BARS, SHEETS AND STRIP • SAE, AISI AND NE ALLOY BARS
DRILL ROD • AIRCRAFT ALLOY BARS AND TUBING • STAINLESS STEEL SHEETS, STRIP,
PLATES, BARS, WIRE, PIPE AND TUBING • SEAMLESS CARBON AND ALLOY TUBING
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NEWS OF INDUSTRY

its trim. The structure has a center trestle of tubular sections supporting the first floor twin light gage cold formed channels spot welded together.

The roof consists of prefabricated trusses composed of light-gage sections ridge welded at intersections, the roof covering being protected metal sheets on fibre-board insulating material.

Here, again, the external cladding is a matter of choice. In this instance, the ground floor up to the head of the windows is a rendering with Tyrolean finish on steel dovetailed sheeting, or on paper backed welded wire fabric. Above this level the external cladding is horizontal ribbed steel sheeting. The inner leaf is of prefabricated panels of plaster board resin bonded to fibre-board insulation, mounted on wood batten stiffening.

The first floor consists of twin light-gage channels spot welded together and spaced 2 ft. approximate center, on which batten and timber floor is attached by clips. The ceiling consists of fibre board or plaster board mounted on wood battens attached to the steel joists.

Window, door, etc., construction is

• • •

STEEL INTERIORS:
The sample houses of steel include interior fittings in the entrance hall, doors, window frames, and staircase. Pressed steel is used extensively in the kitchen.

• • •

the same as in the type "A" house.

The external galvanized steel sheets are painted with a special rough texture "Stone" paint. With the exception of the roof, the remaining external steel finishes are painted with oil-bound paint.

In both houses the main framework is of steel—in "A" of hot rolled sections, in "B" of cold formed sections. These frameworks carry the floors and roof and are situated in the cavity, leaving the walls free to perform their proper



functions of resisting the weather, excluding cold, retaining heat and deflecting noise.

The problem of condensation has been solved, and the degree of insulation achieved, which is greater than that of normal brick construction, is a function of the inner lining. The component which in planning seemed most likely to protrude as a steel unit was the staircase. It has been found, however, to be simple to fabricate and easy to install, and, judged by its appearance and performance, leaves little to be desired.

It should be emphasized that these are trial houses, and therefore subject to all the errors of judgment and inaccuracies of workmanship inseparable from the development of a new building technique. The task of co-ordination has been immense, and the experience gained under field conditions is reflected in the plans now in progress.

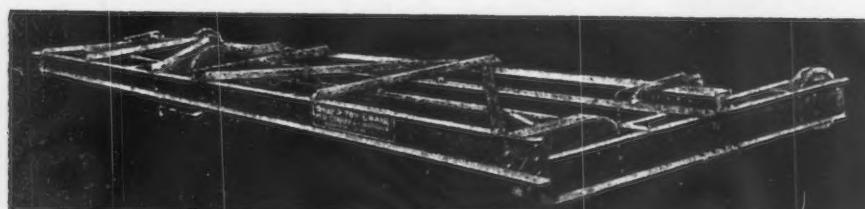
Since the frame carries all the loads, the walls have been designed solely to provide equal or improved standards of insulation and weather resistance. The steel frames, themselves concealed, are capable of infinite variation in their external expression. Arrangements have been made for these to be manufactured in sheet steel for future constructions.

This research on house construction, undertaken by The British Iron and Steel Federation, is being directed by its Housing Committee.

CONCO

**3-Motor Single Girder
CAB OR FLOOR
OPERATED**

ELECTRIC CRANE . . .



● Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — \$129.50, 500 lb. — \$149.50, 1000 lb. — \$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.



CONCO ENGINEERING WORKS

Div. of H. D. Conkey & Co. — 15 Grove St. — Mendota, Ill.

Builders Of Conco Torpedo Electric Hoist

WHAT IS THIS?

It is an artist's conception of what skyscrapers of tomorrow will look like, when full utilization is made of the possibilities presented by air conditioning. With no need to open windows to secure fresh air, huge panels of glass can run from bottom to top throughout the entire building flooding it with sunlight. Moreover, in skyscrapers of the future, light alloys will play an important part. Girders, pillars, window casings and trim will be made of light alloys produced by Bohn. For both strength and beauty can be achieved through the use of these alloys. Bohn is an important name to remember as an outstanding source for light alloys.

BOHN ALUMINUM & BRASS CORPORATION
GENERAL OFFICES—LAFAYETTE BUILDING • DETROIT 26, MICHIGAN
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BOHN

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Dangerous errors in instrument readings can be caused by irregularities on the inside surface of tubing. Ace precision ground steel mandrels help keep this surface accurate in all kinds of glass, fibre, rubber, and plastic tubes.

The Ace battery of centerless grinders offers economies in the production of mandrels from .030" to 6.00" in diameter, and in lengths up to 20 feet. Diameters are held within .0005". They are round to within .0002". And Ace can hold them even closer where necessary.

Ace offers manufacturers today a complete service for producing small parts and assemblies. Here under one roof is the modern equipment, the ability to do fast, accurate work involving stamping, machining, heat-treating, or grinding. Send blueprint, sketch, or sample for quotation.

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CYLINDRICAL GRINDING—Multiple banks of widely varying internal and external cylindrical grinders are available for outside diameters up to 12" by 24" between centers... and inside diameters as small as $\frac{1}{16}$ " or as large as 4" by 2 $\frac{1}{4}$ " long.

THREAD GRINDING—Our battery of Ex-Cell-O Thread Grinders equips us to give you tolerances of .0001" on all Standard V Threads, Acme and Square Threads, and on single or multiple leads. All sizes up to 5" diameter with threads 8" long, on parts up to 20" between centers.



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for Precision Parts



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NEWS OF INDUSTRY

British Motorists Will Wait Long For New Postwar Autos

New York

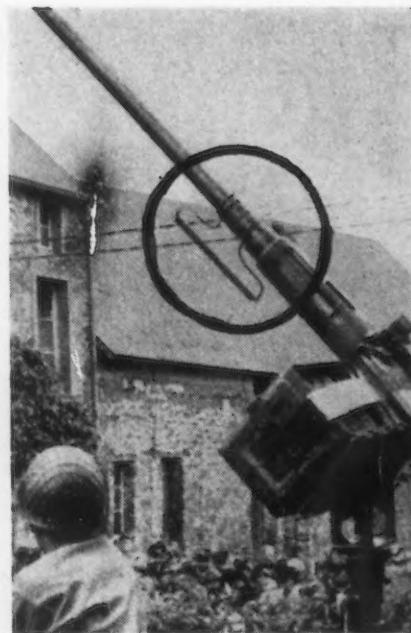
• • • The high postwar expectations of past and prospective English motorists are likely to be somewhat disappointed by the prospect of a temporary shortage of cars. The expansion in the production of new cars—and, especially, the production of new models—will take time. Moreover, if the British motor industry is to secure a permanently larger share of the market in foreign countries as is hoped, a substantial proportion of her production will have to be earmarked for export.

Since the supply of new cars available for the home market is likely to fall short of demand for some time, British motorists will have to rely mainly on the existing stock of cars until new ones become available in adequate numbers. Before the war there were some 2,000,000 cars in the British Isles; it is difficult to estimate how many of these are still serviceable, though the proportion is likely to be well over half. But whatever the proportion, the total number of cars available to the public will, for several years after the defeat of Germany, be smaller than before the war.

This—and the rise in the volume of purchasing power in the hands of the public—explains the inflation in the prices of second-hand cars to which the chairman of the British Price Regulation Committee has recently drawn attention. Here are some of his examples:

	Current Second-hand Price	Second- hand Price	Current Price
	List Price April, 1939	April, 1939	Price
Rover (1939)	\$1,100	\$960	\$2,400
Austin "	700	620	1,000
Morris "	740	620	1,200
Vauxhall "	920	975	1,600
Buick "	2,460	2,000	4,000

The rise in prices, which may well go further, will have the effect of making means rather than needs the test of ownership. But it may have another and scarcely less undesirable effect in that it may delay the urgent need for an increase in the productivity of the motor industry. In a sellers' market there is little incentive to an efficiency drive.



Italian Hot Stove League

Changing the barrel of a 50 cal. machine gun is about as tricky as removing the lid of a hot stove with your bare hands.

Circled above is a "lifter" made by Holly, that solved the problem of seared fingers. Not only does it operate as a wrench in loosening the collar that holds the barrel in place but it also provides a convenient . . . and permanent . . . handle. It's an example, too, of one of the many gadgets we are equipped to make for war — and post war.

Phone Holly 2211
or call Detroit Cherry 4419



Lengthen Service Life ...regardless of unit size!



4 TIMES LONGER LIFE

Eight years' service instead of two, was obtained by a large chemical company through specifying Nickel cast iron in this 8-ton ring. Plain iron used here corroded and eroded $\frac{1}{2}$ " per year. This Nickel alloyed iron wears less than $\frac{1}{8}$ " in the same time.

Increases Result/Dollar Ratio...

In products and applications . . . from a wrench to a railroad . . . records show that a little Nickel goes a long way to lengthen product life, to reduce bulk and deadweight, and to save maintenance costs.

When compared with costs involved, metals to which Nickel is added invariably rise sharply in service value . . . due to improved performance.

Nickel imparts strength, hardness, toughness, resistance to corrosion, heat and abrasive wear. In all fields of industry Nickel offers significant advantages. Send us details of your problem for our recommendations.

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MACHINE TOOLS

. . . News and Market Activities

Tool Builders Get Big Share of New Shell Program Load

Cleveland

• • • As almost everyone knows, the heaviest of the immediate tasks in the new ammunition program is falling on the machine tool builders. They have to make the lathes, the automatics, and the other machines for the new plants to be erected, and out of the \$500,000,000 or so in this construction job over \$100,000,000 is reportedly going to be spent in tools.

This order is not in itself so large when contrasted with current war production, but the tools are needed in a matter of weeks, some of them, in fact, immediately and machine tool factories are still loaded up with such things as radar sections and super-charger drives, tricky jobs other industry found it difficult to make and turned over to the old masters.

No release on these sub-contracts has yet come through and the tool companies lost men when their orders declined in 1943 and they are still losing men between 26 and 34 in the draft, some of these men in a supervisory capacity. No policy change has come through yet to the draft boards but it is expected any day. Part of this country's gross miscalculation of its heavy shell requirement consisted in the cutback of orders for shell making machinery at the time of the general revision some 18 months ago.

The National Association of Machine Tool Builders designed a standard shell lathe which could have been built by concerns in other lines but only 250 were made. Last spring when the manufacturers wanted to go ahead again and make tools under blanket orders to be shipped later to the projected new plants, the Army decided to leave these to individual shell contractors to order. Two weeks ago the system of blanket orders was installed again.

Only certain types of machines are needed for shell making and not all the industry can make them. Right now there isn't time enough to spread the business around and little subcontracting can be attempted. All possible sources are loaded up and with this is the fact that we have full employment.

A prime example of the need for tools is the Massillon plant built for Canton Drop Forge and never used by the Navy. Now the Army is going to spend \$50,000 for partitions and the like and close to a million dollars for automatic screw machines, milling machines, broaches and other fuse making equipment.

These new plants are going to be located generally where labor can be found. Northern New York, for ex-

ample, may get half a dozen mortar shell plants. That basic magnesium plant at Las Vegas, Nevada, which Basic Refractories, Inc., of Cleveland, started to build and then turned over to Anaconda Copper, will make rockets and mortar ammunition. About three million dollars worth of machine tools will be needed and Rheem Manufacturing, which has been making heavy shells at Williamsport and Danville, Pa., will operate the plant.

The \$3,500,000 expansion of Chase Brass's DPC-owned Euclid case plant in Cleveland is the second to be announced this year.

Machine Tool Backlogs Increasing With Unrated Orders Showing Expansion

Cleveland

• • • Within recent months the machine tool industry has found its backlog increasing. The letting down of the bars by WPB so that some customers could place conditional orders for reconversion tools has accounted for part of this activity.

Many machine tool companies are still working on orders reflecting machinery for the manufacturer of mortars and rockets. Probably even before this type of business is completed or expanded events abroad may dictate further activity for ammunition requirements.

Another angle which has contributed to the increased backlog has been the impetus from Russian machine tool orders. It is understood that hardly more than one-half of this business, amounting in the aggregate to \$120,000,000, has been placed.

It is believed that at least one-third of the machine tool orders put on the books in October came under the classification of unrated. If dynamic trends already noticeable in other fields such as steel, automotive and aircraft continue, the machine tool industry may find itself within the near future in about as tight a position as it faced early this year. That there will be no lack of business seems a foregone conclusion at this time.

There seems little doubt according

to machine tool opinion here that machine tools for specific war jobs will again take the spotlight.

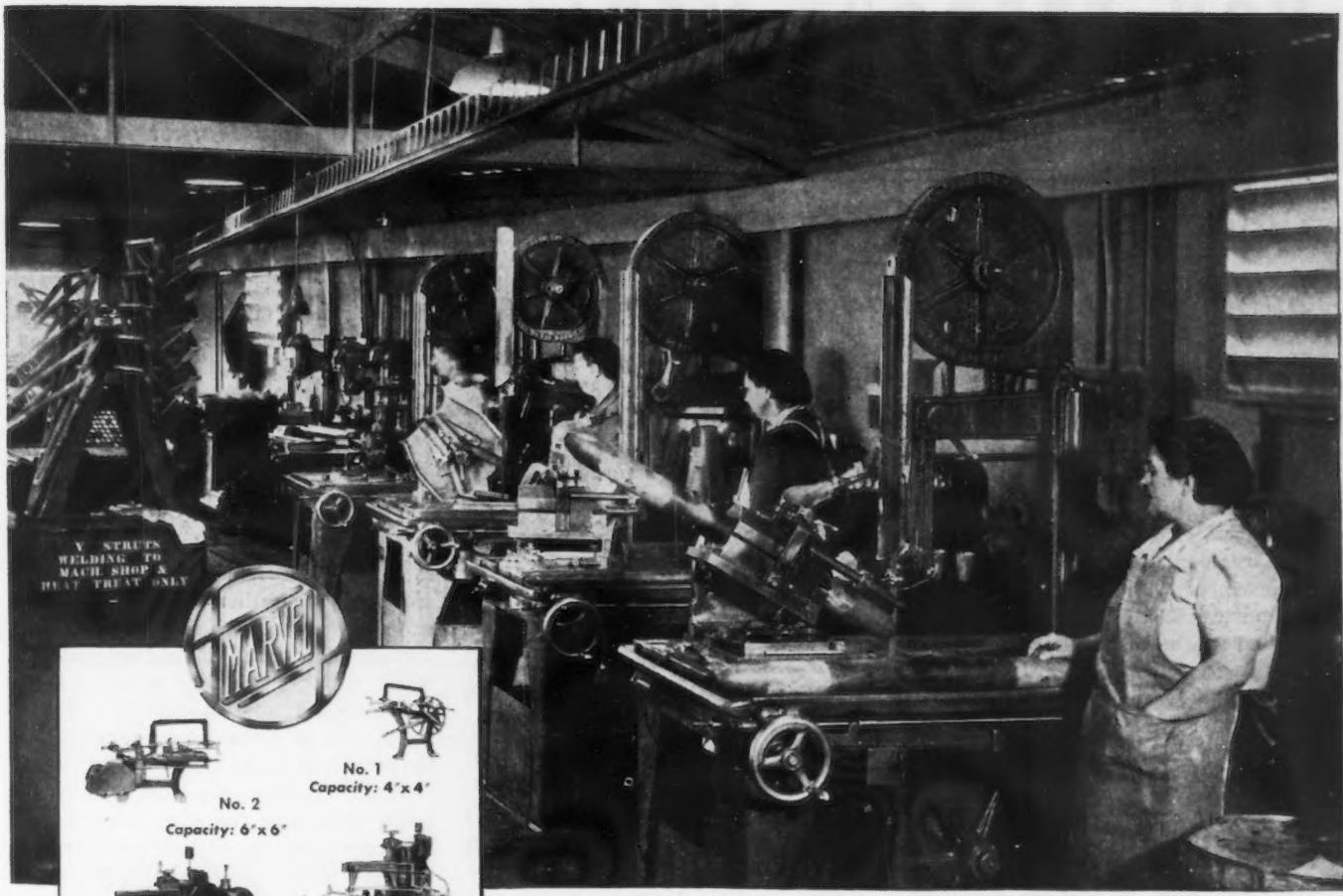
Machinery Dealers To Give Russian Children Complete Machine Shop

New York

• • • Machinery Dealers Institute at a meeting recently, approved a project for the gift of a complete machine shop, to the 3500 war orphans refugee children to be settled in the Russian territory of Biro Bijan according to its Executive Chairman, Herbert I. Segal, general manager of Hasco Machinery Co. of Newark, N. J.

This is part of a program undertaken by the allied machinery industry to provide various complete units of industrial and production equipment to the Biro Bijan settlement. Bernard Goldman was appointed chairman of this committee. Other sections of the machinery industry have already supplied complete units.

The Institute was guest to three speakers including: Stowell Rounds, OPA price attorney for the Machinery Section; Wilbur Wensley, assistant chief, Surplus Machine Tool Section of Defense Plant Corp.; John Schreiber, Co-ordinator Retail Solid Fuel Industry, who described in detail the Biro Bijan program.



MAKE ANGULAR CUTS ON AWKWARD WELDMENTS EASILY

Illustrated are six of the 13 MARVEL No. 8 Universal Metal Cutting Band Sawing Machines in the plant of the National Supply Company in Torrance, California. They are operated entirely by women, cutting tubing at various angles for airplane struts. The National Supply Company selected the No. 8 MARVEL Band Sawing Machines for this work because no other equipment is available to cut these airplane struts with ease, accuracy and economy. They are also using this saw in their tool room, for no matter how small and delicate or heavy and clumsy the job, the MARVEL No. 8 Band Saw will handle it with equal ease.

For production cutting of bar stock up to 10" x 10", they are using three No. 9A MARVEL Saws; which automatically measure, cut and feed bars up to 10" diameter into accurate, equal lengths, similar to a screw machine, without the attention of an operator.

For real big sawing work, such as shipshaft breech blocks of guns and other heavy forgings, three No. 18 MARVEL Universal Roll Stroke Hack Saws are used. These giant saws have made possible the economy, speed and efficiency of the Hack Saw Method on cutting large work up to 18" x 18" and 24" x 24".

A "MARVEL metal cutting specialist" is available to survey your work, to recommend the best solution to your cut-off problem and to furnish accurate cost and production data on your work. All without cost or obligation, of course. Write for full information.

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Eastern Sales Office: 225 Lafayette St., New York 12, N.Y.

MARVEL SAWs

NON-FERROUS METALS

. . . News and Market Activities

WPB Acts to Assure Lead Supplies by Furnishing More Manpower

Washington

• • • Moving to increase production and channel consumption into vital war programs, WPB has urged all lead producers to file requisitions for additional labor immediately with their local USES offices of the WMC. Also regional directors of WPB and chairmen of the Production Urgency Committees in all areas have been requested to assign suitable urgency ratings as a means towards assisting mines, mills, refineries and smelters, both primary and secondary to obtain additional labor.

Spokesmen for WPB's office of vice chairman for Metals and Minerals reported that a shortage of labor has affected all sources of lead supply here and also in foreign countries from which lead in the form of pig and concentrates has been flowing. Labor difficulties in Mexico, a large source of foreign lead, temporarily curtailed the supply in 1944. In this country lack of labor has closed down the lead secondary smelting operations of some plants and others have been reduced to an output far below capacity, WPB said.

Officials of the Minerals and Metals Div. also urged that all concerns engaged in the collection of secondary scrap materials renew their efforts towards making the maximum quantities available to secondary lead smelting plants. They pointed out that the collecting and smelting of scrap lead offers the most immediate source of increased lead output.

Copper

• • • While casting facilities at brass mills are being expanded as rapidly as possible to accommodate the needs of the war production program, it is expected by the industry that a number of months must pass before the additional brass cake capacity is ready. However copper producers report that already the effects of some additional capacity is making itself felt in orders received from the mills.

Supplies of copper for current expanded needs should be adequate when consideration is given to the

Metals Reserve stockpile which was last reported at about 350,000 tons. Moreover our imports of copper from Canada, South America and Rhodesia can probably be increased, if necessary. It is reported that an agreement has been arrived at between the British Government and Canadian copper producers. Details of the agreement have not yet been released but contracting needs of the British Empire for copper should release increased quantities for importation into the United States.

However, according to a recent issue of the *Metal Bulletin*, London, British shell production has also been stepped up and this will involve an increased military demand for copper and brass. It is doubted whether any general re-expansion in war produc-

tion will be effected at this time, so it is probable that consumption may continue light until the government authorizes more civilian production. As in the United States, many bans on the production of copper and brass articles have been lifted in recent months, but other factors such as labor and production facilities are involved.

White Metal Scrap

• • • Prices of aluminum scrap continue to strengthen under the effect of the recent surplus property administration policy of holding government stocks off the market until prices reach specified levels. Inasmuch as the floor prices established by the government have not yet been reached, large accumulations have been withdrawn for stockpiling.

Magnesium scrap is quoted at prices that are merely nominal as ingot producers are not buying magnesium scrap of any kind.

Canadian Copper Men Reach Agreement On Sales with Ministry

Toronto

• • • Representatives of leading copper producers in Canada have reached an agreement with the British Government on a plan for orderly marketing of copper reserves and war-scrap copper. A four-man delegation speaking for the most powerful copper interests in Canada, have concluded talks with the British Ministry of Supply officials, after conferences with Cabinet Ministers, Treasury officials and other British agencies. While details of the proposed plan have not been disclosed, it is stated that both sides are "completely satisfied." The Canadian spokesmen were, James Y. Murdoch, President of Noranda Mines Ltd.; L. K. Brindley, vice-president of Falconbridge Nickel Mines Ltd.; J. H. C. Waite, President of Mining Corporation of Canada Ltd.; and K. A. Creary, President of British Metal Corporation (Canada) Ltd. Mr. Creary acted as liaison of-

ficer between Canadian copper producers and the British Government.

The last full scale copper discussions in Britain were in October, 1939, at which time producers in Canada and other parts of the British Empire, agreed not to increase their profit demand in sale of copper to Britain during wartime.

Increase Urged by Union

Weirton, W. Va.

• • • The United Steelworkers of America contends that wage increases recently approved by the war labor board should be extended to employees of the Weirton and Steubenville, Ohio plants of the Weirton Steel Company.

The union, in a letter signed by Robert J. Davidson who is directing the Weirton organizing campaign, told WLB Chairman William H. Davis that the "directive order essentially covers the entire industry" except Weirton Steel.

No comment was made by the company whose employees are now represented by an independent union.

NON-FERROUS METALS PRICES

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	\$17.00
Cadmium, del'd.	9.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$4.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$130.00 to \$140.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb., unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing	
No. 2, 3, 4	6.00 to 9.50
Brass Ingots	
85-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

Extruded Shapes Rods Sheets		
Copper	20.87	20.37
Copper, H.R.	17.37	
Copper drawn	18.37	
Low brass, 80%	20.40	20.15
High brass		19.48
Red brass, 85%	20.61	20.36
Naval brass	20.37	19.12
Brass, free cut	15.01	
Commercial bronze, 90%	21.32	21.07
Commercial bronze, 95%	21.53	21.28
Manganese bronze	24.00	28.00
Phos. bronze, A, B, 5%	36.50	36.25
Muntz metal	20.12	18.87
Everdur, Herculoy, Olympic or equal	25.50	26.00
Nickel silver, 5%	28.75	26.50
Architect bronze	19.12	

Aluminum

(Cents per lb., subject to extras on gauge, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. ($\frac{1}{2}$ H); 52S, 61c. (O); 24S, 67 $\frac{1}{2}$ c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a. lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 $\frac{1}{2}$ c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price: 17ST and 11ST-3, screw machine stock. Rounds: $\frac{1}{4}$ in., 28 $\frac{1}{2}$ c. per lb.; $\frac{1}{2}$ in., 26c.; 1 in., 24 $\frac{1}{2}$ c.; 2 in., 22c. Hexagons: $\frac{1}{4}$ in., 34 $\frac{1}{2}$ c. per lb.; $\frac{1}{2}$ in., 28 $\frac{1}{2}$ c.; 1 in., 25 $\frac{1}{2}$ c.; 2 in., 25 $\frac{1}{2}$ c. 2S, as fabricated, random or standard lengths, $\frac{1}{4}$ in., 24c. per lb.; $\frac{1}{2}$ in., 26c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 $\frac{1}{2}$ c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a. lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25*
Manganese bronze solids	6.25*
Manganese bronze borings	6.50*
Manganese bronze borings	5.50*

OPA Group 4†

Refinery brass	4.75*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 $\frac{1}{4}$
Electrolytic, full size	22 $\frac{1}{2}$
cut to size	30 $\frac{1}{2}$
Rolled, oval, straight, 15 in. and longer	23 $\frac{1}{4}$
Curved	24 $\frac{1}{4}$
Brass Cast, 82-20, elliptical, 15 in. and longer	23 $\frac{1}{2}$
Zinc: Cast, 99.99, 16 in. and over	16 $\frac{1}{4}$
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbis.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots.	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc, cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbis.	6.80

SCRAP

... News and Market Activities

Scrap Prices Stabilized at Ceilings

• • • The scrap market has reached price levels at which there seems to be stabilization. There are indications from many districts that despite prices of all open hearth grades having reached ceilings, adequate supplies of scrap are not coming into the market to meet mill requirements. For several weeks now this situation has been attributed to snow and cold weather, which is undoubtedly true to some extent.

Lesser attention has been devoted to the fact that the accumulation and preparation of scrap is being retarded by the labor shortage resulting largely from the recent scrap price lows. It was obvious that those prices caused a deterioration of the proper functioning of the scrap trade by withdrawals of labor from industry. A large portion of this personnel has failed to return now that it is functioning more normally again.

Price changes this week are confined in almost all instances to small upward revisions of blast furnace grade prices. These are very close to ceilings and have in fact reached them in a few instances.

There has been an estimated drop in scrap stocks from July 31, 1943 to Nov. 30, 1944 of about 22 per cent, and a drop of about 13 per cent from Jan. 31, 1944 to Nov. 30, 1944. The drop during the eleven months of this year was accounted for almost entirely since October. At a time of the year when normally scrap stocks are being built up, there was a substantial drop.

There are varying reasons offered for this condition, one of which was war optimism. The steel industry was told in Washington by various officials that the war was almost over, and consequently burdens of high cost metallics were worked off, so the industry would not be caught in a sharply falling price market with ceiling price scrap.

PITTSBURGH—With little scrap moving in this area because of the deep snow and cold weather and no let-up in sight, prices on the heavy melting grades are steady at the ceiling. The turnings grades, while not at ceiling, are notably stronger in the market evidenced by the advance in machine shop and mixed borings and turnings.

CHICAGO — Scattered mill purchases have been made at ceiling prices for both dealer and industrial scrap; but interest remains limited and it is a matter of conjecture whether such prices can be secured in the future for material of other than industrial origin. Despite dealer optimism, prices on machine shop turnings and blast furnace grades have moved upward only sluggishly and there is no evidence to indicate purchases at substantially higher prices.

CLEVELAND—Prices are at ceilings here and dealers have shipped out almost everything, which wasn't much since the mills report that shipments are not coming in right. Open hearth is tied up because of yard conditions, dealers can't get any help and news of the Nazi counter-attack has everyone on edge in view of the shorter ore inventory the mills are carrying.

DETROIT—Movement of scrap out of Michigan and Detroit yards continued in good volume this week, with mill orders holding up in their earlier substantial fashion. There were no changes from last week's prices, and there was no indication of any early breakdown from the ceiling prices reached earlier this month on scrap at Detroit. Offers on several automotive lists closing next week are expected to be identical at the ceiling for most of the basic grades.

ST. LOUIS—The movement of scrap iron to the St. Louis industrial district was further slowed down as a result of

Washington

• • • Charles R. Hook, president of the American Rolling Mill Co., Middletown, Ohio, will be the principal speaker at the annual banquet concluding the two-day annual meeting and war scrap forum of the Institute of Scrap Iron & Steel Inc. at Cincinnati on Jan. 11.

L. S. Hamaker, assistant general manager of sales, Republic Steel Corp., Cleveland, will speak on "The Postwar Impact of the Light Metals and Plastics of the Steel Industry."

Murray Seasongood, formerly mayor of Cincinnati, a leading lawyer and chairman of the City Planning Commission, will be toastmaster at the banquet.

David J. Joseph of the D. J. Joseph Co., Cincinnati, is chairman of the banquet committee.

severe cold weather and the Christmas holidays. Operations in the yards were similarly hampered. Prices are unchanged.

PHILADELPHIA — Slowing down of scrap movements last week because of inclement weather has increased the demand on the part of mills for better shipments. All open hearth grades and low phos remain at ceilings and in all probability turnings will up there very soon. In fact, sales of heavy axle forge turnings are reported at \$18.25.

NEW YORK—Cast and open hearth prices continue at ceilings in this district and turnings remain at the same rather high level as last week. Dealers report that mills are placing orders in good volume but that sufficient scrap to satisfy the demand is not being offered. This is attributed partly to the early snowfall for this area and partly to the loss of collectors, processors and truckmen to other fields during the recent period of inactivity and low prices. Many of these men have made other connections which they are now reluctant to sever.

CINCINNATI—The scrap market continued strong in the past week but holidays had some effect on the number of transactions. More activity is expected next week.

YOUNGSTOWN—Similar to conditions in other districts, prime grades of scrap are not too plentiful. The holiday situation has had some effect on sales, but some interests are a trifle anxious over the possibility of an even tighter scrap situation in coming weeks in view of the high steel operating rates and the increase in war demand.

BIRMINGHAM — Demand for open hearth and blast furnace grades remains strong here but little interest is being shown in electric furnace and foundry grades since consumers have large inventories on hand, bought at prices well below ceiling. Scrap supplies generally in dealers yards in this area are low.

BUFFALO—The market took a breather this week after the flurry created by the leading consumer's buying activities. More snow and cold weather, together with the Christmas Holiday, contributed generously to the cooling off process. Of the open hearth grades, only No. 1 heavy melting steel commands the full ceiling, although some dealers are asking the OPA maximum for No. 2 melting and No. 1 bundles. The lower end of the list continues to lag, with machine shop turnings the soft spot in a generally firm structure. Improving demand is noted for electric furnace items which recently had been sluggish, although the pickup is not uniform.

CINCINNATI — Rumors of sales on heavy melting steel in this area at the ceiling gave added strength to the market. Cast grades tend to be scarcer and the entire list has gained in basic strength. Consumers are not overeager for material but are accepting on contract. Inventories are still in fair quantity running from three months or more. It is believed however that a continuation of the high steel rate and the demand for more war material may cause inventories to decline over the next month or so.

Iron and Steel Scrap Prices

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$20.00
RR. hvy. melting	21.00
No. 2 hvy. melting	20.00
RR. scrap rails	21.50
Rails 3 ft. and under	23.50
No. 1 comp'd sheets	20.00
Hand bld. new shts	20.00
Hvy. axle turn.	\$17.50 to 18.00
Hvy. steel forge turn.	17.50 to 18.00
Mach. shop turn.	13.75 to 14.25
Short shov. turn.	16.00 to 16.50
Mixed bor. and turn.	13.75 to 14.25
Cast iron borings	16.00 to 16.50
Hvy. break. cast	16.50
No. 1 cupola	20.00
RR. knuck. and coup.	24.50
RR. coil springs	24.50
Rail leaf springs	24.50
Rolled steel wheels	24.50
Low phos. billet crops	24.45
Low phos.	22.50
RR. malleable	22.00

CHICAGO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.75
No. 2 hvy. melting	\$17.75 to 18.75
No. 1 bundles	18.75
No. 2 dealers' bndls.	17.50 to 18.25
Galv. bundles (No. 3)	13.75 to 14.25
Mach. shop turn.	10.25 to 10.75
Short shoveling turn.	10.75 to 11.50
Cast iron borings	10.75 to 11.50
Mix. bor. & short turn.	10.75 to 11.50
Low phos. hvy. forge	23.75
Low phos. plates	21.25
No. 1 RR hvy. melting	19.25 to 19.75
Reroll rails	22.25
Cut rails, 3 ft. and under	22.25
Locomotive tires, cut	22.25 to 22.75
Cut bolsters & side frames	19.75 to 20.25
Angles & splice bars	32.25
St'dard stl. car axles	25.25 to 25.75
No. 3 steel wheels	20.75 to 21.25
Couplers & Knuckles	21.50 to 22.00
Miscellaneous rails	20.25
Agricul. malleable	21.00 to 21.50
RR. malleable	22.00
No. 1 mach. cast	20.00
No. 1 agricul. cast	20.00
Cast iron car wheels	20.00
Hvy. breakable cast	16.50
RR. grate bars	15.25
Brake shoes	15.25
Stove plate	19.00
Clean auto cast	20.00

CINCINNATI

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.00 to \$18.50
No. 2 hvy. melting	17.00 to 17.50
No. 1 bundles	18.00 to 18.50
No. 2 bundles	16.00 to 16.50
Mach. shop turn.	6.50 to 7.00
Shoveling turn.	8.00 to 8.50
Cast iron borings	8.50 to 9.00
Mixed bor. & turn.	7.00 to 7.50
No. 1 cupola cast	21.00
Hvy. breakable cast	16.50
Low phos. plate	20.50 to 21.50
Scrap rails	20.00 to 21.00
Stove plate	16.00 to 16.50

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars	
No. 1 hvy. melting	\$15.05
No. 2 hvy. melting	15.05
Busheling	15.05
No. 1 and 2 bundles	15.05
Turnings, shoveling	\$8.50 to 9.50
Turnings, regular	6.50 to 7.50
Mixed bor. & turn.	6.50 to 7.50
Clean cast, chem. bor.	13.00 to 14.15
Delivered to fdry. per gr. ton	
Breakable cast	21.57 to 21.87
Stove plate	20.00 to 23.51
Machinery cast, truck	21.00 to 23.51

DETROIT

Per gross ton, brokers' buying prices:	
No. 1 hvy. melting	\$17.32
No. 2 hvy. melting	17.32
No. 1 bundles	17.32
New busheling	17.32
Mach. shop turn.	\$7.75 to 8.25
Short shov. turn.	10.75 to 11.25
Cast iron borings	10.25 to 10.75
Mixed bor. & turn.	7.75 to 8.25
No. 1 cupola cast	20.00
Charging box cast	15.50 to 16.50
Hvy. breakable cast	14.00 to 15.00
Stove plate	18.50 to 19.00
Flashings	17.32
Low phos. plate	18.50 to 19.82
Automotive cast	20.00

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$18.75
No. 2 hvy. melting	18.75
No. 2 bundles	18.75
Mach. shop turn.	\$13.00 to 13.50
Shoveling turn.	14.50 to 15.00
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	13.00 to 13.50
No. 1 cupola cast	20.00
Hvy. breakable cast	16.50
Cast, charging box	19.00
Hvy. axle, forge turn.	18.25
Low phos. plate	21.25
Low phos. punchings	21.25
Billet crops	21.00 to 21.25
RR. steel wheels	23.25
RR. coil springs	23.25
RR. malleable	22.00

ST. LOUIS

Per gross ton delivered to consumer:	
Hvy. melting	\$17.50
No. 1 locomot'e tires	\$17.50 to 18.00
Misc. stand. sec. rails	19.00
Railroad springs	19.50 to 20.00
Bundled sheets	13.00 to 13.50
Heavy axle turn.	14.00 to 14.50
Machine shop turns.	7.50 to 8.00
Rerolling rails	21.00
Steel car axles	21.00 to 21.50
Steel rails under 3 ft.	21.50
Steel angle bars	18.50 to 19.00
Cast iron car wheels	20.00
No. 1 machinery cast	20.00
Railroad malleable	20.00 to 20.50
Breakable cast	16.50
Stove plate	17.00
Grate bars	15.25
Brake shoes	15.25
Note: Cast grades f.o.b. Shipping Point.	

BIRMINGHAM

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$16.00 to \$16.50
No. 2 hvy. melting	16.00 to 16.50
No. 2 bundles	15.00 to 15.50
No. 1 busheling	13.50 to 14.00
Scrap rails	17.00 to 17.50
Rails for rerolling	19.00 to 19.50
Rails 3 ft. & under	19.00 to 19.50
Angles & splice bars	18.00 to 18.50
Long turn.	5.50 to 6.00
Cast iron borings	8.50 to 9.00
Steel axles	16.00 to 16.50
Stove plate	17.00 to 17.50
Bar crops and plate	17.00 to 17.50
Structural and plate	17.00 to 17.50
No. 1 cast	20.00 to 21.00
Cast iron carwheels	13.50 to 14.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	20.00
Low phos. plate	22.50
No. 1 busheling	20.00
Hydraulic bundles	20.00
Mach. shop turn.	13.50 to 14.00
Short shovel. turn.	16.00 to 16.50
Cast iron borings	15.00 to 15.50

NEW YORK

Dealers' buying prices, per gross ton, on cars:	
No. 1 hvy. melting	\$15.33
No. 2 hvy. melting	15.33
Hyd. comp. black bundles	15.33
Hyd. comp. galv. bundles	13.33
Hvy. breakable cast	16.50
Charging box cast	19.00
No. 1 cupola cast	20.00
Clean auto cast	20.00
Unstrip. motor blks.	17.50
Stove plate	19.00
Clean chem. cast bor.	14.33
Mach. shop turn.	8.50 to 9.00
Mixed bor. & turn.	8.50 to 9.00

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$19.25
No. 1 bundles	\$18.50 to 19.00
No. 2 bundles	17.50 to 18.00
No. 2 hvy. melting	18.50 to 19.00
Mach. shop turn.	10.50 to 11.00
Shoveling turn.	14.25 to 14.75
Cast iron borings	11.00 to 11.50
Mixed bor. & turn.	11.00 to 11.50
No. 1 cupola cast	20.00
Stove plate	19.00
Low phos. plate	21.75
Scrap rails	20.00 to 20.25
Rails 3 ft. & under	22.75
RR. steel wheels	23.75
Cast iron car wheels	20.00
RR. coil & leaf sprgs.	23.75
RR. knuckles & coup.	23.75
RR. malleable	22.00
No. 1 busheling	18.50 to 19.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
Compressed sheet stl.	19.50
Drop forge flashings	\$18.50 to 19.00
No. 2 bundles	19.50
Mach. shop turn.	14.50
Short shovel.	16.50
No. 1 busheling	19.50
Steel axle turn.	17.50 to 18.00
Low phos. billet and bloom crops	23.66
Cast iron borings	15.50
Mixed bor. & turn.	14.50
No. 2 busheling	17.00
No. 1 machine cast	20.00
Railroad cast	20.00
Railroad grate bars	15.25
Stove plate	19.00
RR. hvy. melting	20.50
Rails 3 ft. & under	23.00
Rails 18 in. & under	24.25
Rails for rerolling	23.00
Railroad malleable	22.00
Elec. furnace punch	21.50 to 22.00

SAN FRANCISCO

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$16.00 to \$16.75
RR. hvy. melting	16.00 to 16.75
No. 2 hvy. melting	15.00 to 15.75
No. 2 bales	14.00 to 14.75
No. 3 bales	10.00 to 10.75
Mach. shop turn.	7.00
Elec. furn 1 ft., under	16.00 to 17.50
No. 1 cupola cast	20.00 to 22.00

LOS ANGELES

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$14.00 to \$15.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bales	12.00 to 13.00
No. 3 bales	10.00 to 10.50
Mach. shop turn.	5.00
No. 1 cupola cast	20.00 plus frt.

SEATTLE

Per gross ton delivered to consumer:	
No. 1 hvy. melting	\$13.50
RR. hvy. melting	13.50

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel:	Dec. 26, Dec. 19, Nov. 21, Dec. 28,				Pig Iron:	Dec. 26, Dec. 19, Nov. 21, Dec. 28,			
(Cents Per Lb.)	1944	1944	1944	1943	(Per Gross Ton)	1944	1944	1944	1943
Hot rolled sheets	2.10	2.10	2.10	2.10	No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$25.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace....	24.00	24.00	24.00	24.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti...	25.11	25.11	25.11	24.68
Hot rolled strip	2.10	2.10	2.10	2.10	No. 2, Birmingham....	20.38	20.38	20.38	20.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa...	25.34	25.34	25.34	25.39
Plates, wrought iron....	3.80	3.80	3.80	3.80	Basic, Valley furnace....	23.50	23.50	23.50	23.50
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00	Malleable, Chicago†	24.00	24.00	24.00	24.00
Tin and Terne Plate:					Malleable, Valley	24.00	24.00	24.00	24.00
(Dollars Per Base Box)					L. S. charcoal, Chicago..	37.34	37.34	37.34	31.34
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00	Ferromanganese‡	135.00	135.00	135.00	135.00
Tin plate, electrolytic...	4.50	4.50	4.50	4.50					
Special coated mfg. terne	4.30	4.30	4.30	4.30					

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

‡For carlots at seaboard.

Bars and Shapes:					Scrap:				
(Cents Per Lb.)	1944	1944	1944	1943	(Per Gross Ton)	1944	1944	1944	1943
Merchant bars	2.15	2.15	2.15	2.15	Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$18.25	\$20.00
Cold finished bars	2.65	2.65	2.65	2.65	Heavy melt'g steel, Phila.	18.75	18.75	15.50	18.75
Alloy bars	2.70	2.70	2.70	2.70	Heavy melt'g steel, Ch'go	18.75	18.75	17.50	18.75
Structural shapes	2.10	2.10	2.10	2.10	No. 1 hy. comp. sheet, Det.	17.32	17.32	12.50	17.85
Stainless bars (No. 302).	24.00	24.00	24.00	24.00	Low phos. plate, Youngs'n	22.50	22.50	19.75	22.50
Wrought iron bars	4.40	4.40	4.40	4.40	No. 1 cast, Pittsburgh....	20.00*	20.00*	20.00*	20.00

*F.o.b. shipping point.

Wire and Wire Products:					Coke, Connellsville:				
(Cents Per Lb.)	1944	1944	1944	1943	(Per Net Ton at Oven)	1944	1944	1944	1943
Plain wire	2.60	2.60	2.60	2.60	Furnace coke, prompt...	\$7.00	\$7.00	\$7.00	\$6.50
Wire nails	2.55	2.55	2.55	2.55	Foundry coke, prompt...	8.25	8.25	8.25	7.50

Rails:					Non-Ferrous Metals:				
(Dollars Per Gross Ton)	1944	1944	1944	1943	(Cents Per Lb. to Large Buyers)	1944	1944	1944	1943
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	Copper, electro., Conn...	12.00	12.00	12.00	12.00
Light rails	40.00	40.00	40.00	40.00	Copper, Lake	12.00	12.00	12.00	12.00

Semi-Finished Steel:					Non-Ferrous Metals:				
(Dollars Per Gross Ton)	1944	1944	1944	1943	(Cents Per Lb. to Large Buyers)	1944	1944	1944	1943
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Copper, electro., Conn...	12.00	12.00	12.00	12.00
Sheet bars	34.00	34.00	34.00	34.00	Copper, Lake	12.00	12.00	12.00	12.00
Slabs, rerolling	34.00	34.00	34.00	34.00	Tin (Straits), New York.	52.00	52.00	52.00	52.00
Forging billets	40.00	40.00	40.00	40.00	Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00	Lead, St. Louis.....	6.35	6.35	6.35	6.35

Wire Rods and Skelp:					Non-Ferrous Metals:				
(Cents Per Lb.)	1944	1944	1944	1943	(Cents Per Lb. to Large Buyers)	1944	1944	1944	1943
Wire rods	2.00	2.00	2.00	2.00	Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Skelp	1.90	1.90	1.90	1.90	Nickel, electrolytic	35.00	35.00	35.00	35.00

The various basing points for finished and semi-finished steel are listed in the detailed price table, pages 136-145.

Composite Prices . . .					PIG IRON					SCRAP STEEL
	1944	1944	1944	1943	1944	1944	1944	1944	1943	1944
FINISHED STEEL										
December 26, 1944....	2.30837c.	2.30837c.	2.30837c.	2.30837c.	23.61	a Gross Ton.....				\$19.17 a Gross Ton.....
One week ago.....	2.30837c.	2.30837c.	2.30837c.	2.30837c.	23.61	a Gross Ton.....				\$19.17 a Gross Ton.....
One month ago	2.30837c.	2.30837c.	2.30837c.	2.30837c.	23.61	a Gross Ton.....				\$17.08 a Gross Ton.....
One year ago	2.25513c.	2.25513c.	2.25513c.	2.25513c.	23.61	a Gross Ton.....				\$19.17 a Gross Ton.....

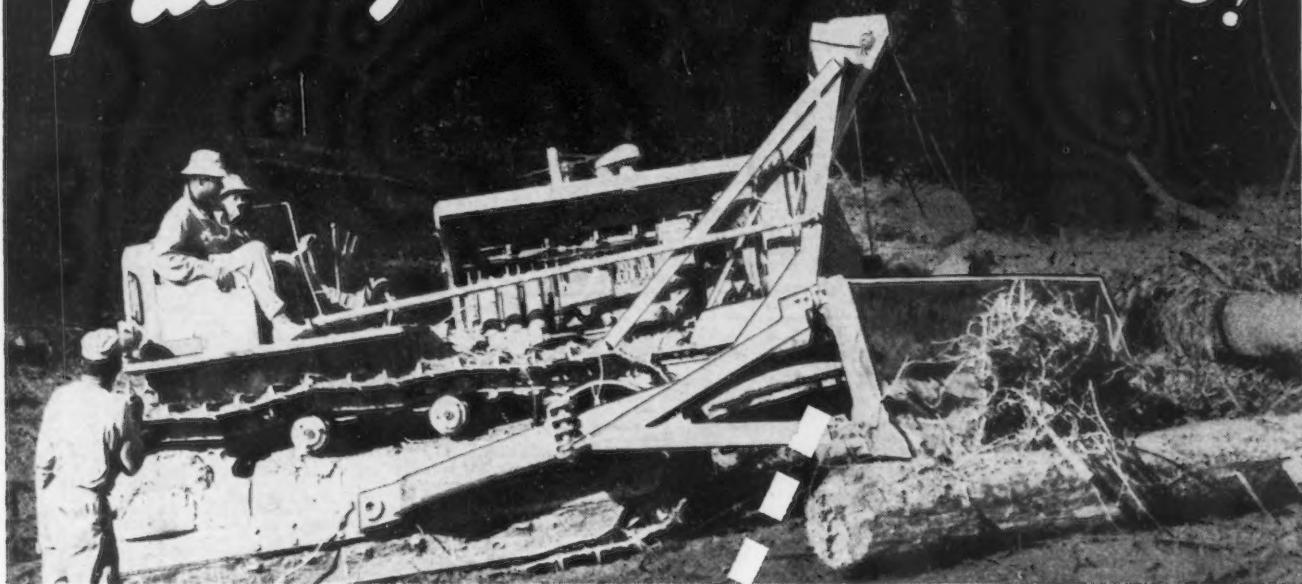
HIGH	LOW	HIGH	LOW	HIGH	LOW
1944.... 2.30837c., Sept.	5 2.272349c., Jan.	23.61	\$23.61	\$19.17	\$19.17
1943.... 2.25513c.,	2.25513c.,	23.61	23.61	19.17	19.17
1942.... 2.26190c.,	2.26190c.,	\$23.61, Mar.	\$23.45, Jan.	10 \$22.00, Jan.	7
1941.... 2.43078c.,	2.43078c.,	23.45, Dec.	22.61, Jan.	9 21.88, Dec.	30
1940.... 2.30467c., Jan.	2 2.24107c., Apr.	22.61, Sept.	20.61, Sept.	14.08, May	16
1939.... 2.35367c., Jan.	3 2.26689c., May	20.61, Sept.	19.61, July	11.00, June	7 15.00, Nov.
1938.... 2.58414c., Jan.	4 2.27207c., Oct.	19.61, July	18.73, Aug.	12.67, June	8 21.92, Mar.
1937.... 2.58414c., Mar.	9 2.32263c., Jan.	18.73, Aug.	17.83, May	12.67, June	9 17.75, Dec.
1936.... 2.32263c., Dec.	28 2.05200c., Mar.	17.83, May	16.90, Jan.	10.33, Apr.	29 13.42, Dec.
1935.... 2.07642c., Oct.	1 2.06492c., Jan.	16.90, Jan.	15.56, Jan.	9.50, Sept.	25 13.00, Mar.
1934.... 2.15367c., Apr.	24 1.95757c., Jan.	15.56, Jan.	14.81, Jan.	6.75, Jan.	3 12.25, Aug.
1933.... 1.95578c., Oct.	3 1.75836c., May	14.81, Jan.	13.56, Dec.	6.43, July	5 8.50, Jan.
1932.... 1.89196c., July	5 1.83901c., Mar.	13.56, Dec.	15.90, Jan.	8.50, Dec.	29 11.33, Jan.
1931.... 1.99626c., Jan.	13 1.86586c., Dec.	15.90, Jan.	14.79, Dec.	11.25, Dec.	9 15.00, Feb.
1930.... 2.25488c., Jan.	7 1.97319c., Dec.	14.79, Dec.	15.90, Dec.	14.08, Dec.	3 17.58, Jan.
1929.... 2.31773c., May	28 2.26498c., Oct.	15.90, Dec.	18.21, Dec.	17.58, Jan.	29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Putting "Hep" IN THE "CATS!"



NEWSWEEK of August 28 reports of Lieut.-General George S. Patton, Jr., as follows: "If he had to choose between tanks and bulldozers for an invasion he would choose road-building equipment every time." More than a construction machine, the bulldozer has been a powerful factor in winning many battles.

To quickly, efficiently fit axle shafts and bearing cups into bulldozer transmission cases, American engineers designed a special horizontal assembly press. A conveyor line brings the cases to the machine and removes them after operations are completed. The part is

stopped, locked in position, pressed, and released by this hydraulically operated, push button controlled machine.

This is another example of how the American Broach and Machine Company help leading manufacturers increase output of vital war materials. When the war job is done, American's complete service of machines, tools, and engineering will be available to speed manufacture of civilian goods. Let American engineers show you how broaching or special machinery can solve your production problems. Write today for details.



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Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 0.10¢ per lb. under base; primes 0.25¢ above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50¢. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point ↓ Product	DELIVERED TO														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middleton, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Philadelphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢	2.65¢	2.20¢	2.34¢	2.27¢	
Cold Rolled Sheets ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢	3.70¢	3.15¢	3.39¢	3.37¢	
Galvanized Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢	4.05¢		3.74¢	3.67¢	
Enameled Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢	4.00¢	3.45¢	3.71¢	3.67¢	
Long Terns ²	3.80¢	3.80¢	3.80¢								4.55¢		4.16¢	4.12¢	
Hot Rolled Strip ³	2.10¢	2.10¢	2.10¢	2.10¢			2.10¢			2.10¢	2.75¢	2.20¢	2.46¢		
Cold Rolled Strip ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)				2.90¢	3.16¢		
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢						2.56¢		
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)				3.05¢	3.31¢		
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10				5.36¢	5.32¢	
.25 .50 .75 Electro Tin Plate, Box	\$4.35 \$4.50 \$4.65	\$4.35 \$4.50 \$4.65	\$4.35 \$4.50 \$4.65												
Black Plate (29 gage) ⁵	3.05¢	3.05¢	3.05¢					3.15¢			4.05¢ ¹⁰			3.37¢	
Mfg. Ternes, Special Box	\$4.30	\$4.30	\$4.30					24.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢		
Rail Steel Bars ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.80¢					
Reinforcing (Billet) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.50¢	2.55¢ ¹⁰	2.25¢	2.39¢		
Reinforcing (Rail) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	c2.55¢ ¹⁰	2.25¢	2.47¢		
Cold Finished Bars ⁸	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢	(Detroit = 2.70¢)	(Toledo = 2.80¢)				2.99¢	2.97¢		
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢				
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢					3.45¢				
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.35¢	2.45¢	2.65¢	2.32¢	2.29¢	2.15¢	
Floor Plates	3.35¢	3.35¢								3.70¢	4.00¢		3.71¢	3.67¢	
Alloy Plates	3.50¢	3.50¢				(Coatesville = 3.50¢)				3.95¢	4.15¢		3.70¢	3.59¢	
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢	
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
Bright Wire ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢	2.60¢	(Worcester = 2.70¢)	(Duluth = 2.65¢)	3.10¢				2.92¢		
Galvanized Wire				Add			proper size extra and galvanizing extra to Bright Wire base.								
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)			3.70¢			3.52¢		
Steel Sheet Piling	2.40¢	2.40¢				2.40¢				2.95¢			2.72¢		

EXCEPTIONS TO PRICE SCHED. NO. 6
Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50.
Bblooms—Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Pgh. Steel Co. (reroll) \$38.25, (forging) \$44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth.
Sheet bar—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Ports-mouth, Ohio.
Billets, Forging—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto; Phoenix Iron Co. \$47.00 mill. Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50.
Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1 1/4 x 1 1/4) \$39.50, (2 x 2 1/2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich. Geneva Steel Co. \$58.64 f.o.b. Pac. C. Pgt. Steel Co. \$43.50.

Structural Shapes—Phoenix Iron Co. \$2.35 basing pts. (export) \$2.50 Phoenixville; Knoxville Iron Co. \$2.30 basing points.
Rails—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo. Hot Rolled Plate—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. and Geneva Steel Co. \$2.20 Pacific Ports; Central Iron and Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City.
Merchant Bars—W. Ames Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp. \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. Laclede Steel Co. sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. \$2.75 f.o.b. Milton, Pa.
Pipe Skelp—Wheeling Steel Corp., Benwood, \$2.05 per ewt.
Reinforcing Bars—W. Ames & Co., 10 tons and over, \$2.85 mill; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. Laclede Steel Co. sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. \$2.75 f.o.b. Milton, Pa.
Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass.

f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.
Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Conore Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.
Hot Rolled Strip—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts.
Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co. \$2.25 Parkersburg.
Galvanized Sheets—Andrews Steel Co. \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.85 Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.
Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.
Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.



STEWART

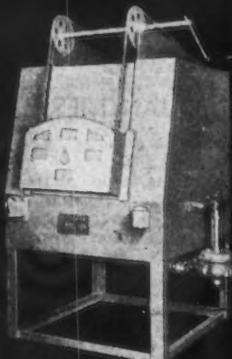
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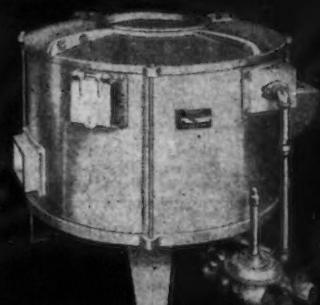
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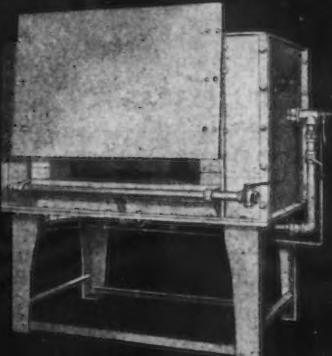
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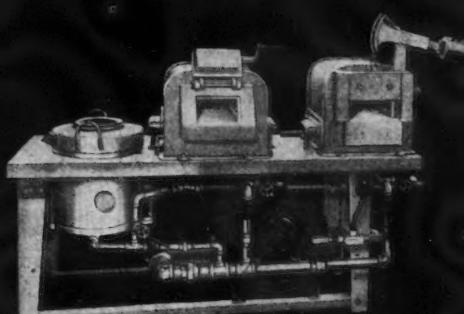
ROUND POT FURNACE



OPEN SLOT FORGE



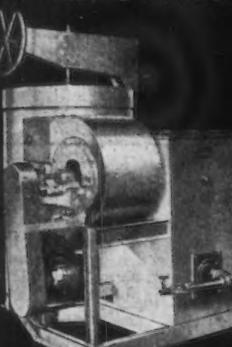
STATIONARY METAL
MELTING FURNACE



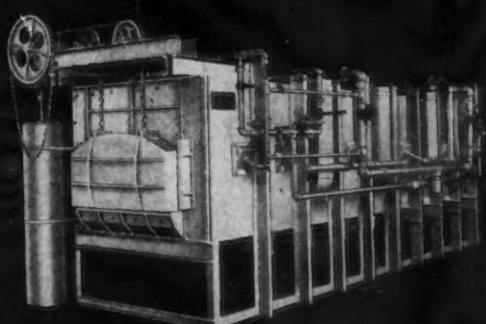
TRIPLE PURPOSE COMBINATION



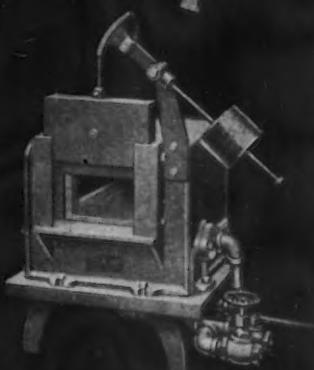
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AIR DRAW
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FURNACE



HEAVY PORTABLE OVEN FURNACE



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STEWART INDUSTRIAL FURNACE DIVISION OF CHICAGO FLEXIBLE SHAFT COMPANY
Main Office: 5600 W. Roosevelt Road, Chicago 50, Ill.—Canada Factory: (FLEXIBLE SHAFT CO., LTD.) 321 Weston Rd., So., Toronto

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9442-45 Ann	Cold Drawn, NE 8617-20	Hot Rolled, NE 9442-45 Ann	Cold Drawn, NE 8617-20
Philadelphia	3.518	4.872 ⁶	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.968	7.068	7.272	8.322
New York	3.590	4.613 ⁸	5.010	3.974 ⁶	4.772	3.768	3.758	3.853	4.103	8.008	7.108	7.303	8.353
Boston	3.744	4.749 ⁹	5.224 ⁸	4.106	4.715	3.912	3.912	4.044	4.144	8.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	.....	.....	.....	.....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	.....	.....	.....	.....
Chicago	3.25	4.20	5.231	3.60	4.85 ¹⁷	3.55	3.55	3.50	3.75	5.75	8.85	8.85	7.90
Milwaukee	3.387	4.337 ³	5.2724	3.737	4.787 ¹⁷	3.687	3.687	3.837	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 ⁴	3.60	4.45	3.40	3.588	3.35	3.75	5.958	7.058	8.85	7.90
Buffalo	3.35	4.40	4.784	3.819	4.669	3.63	3.40	3.35	3.75	5.75	8.85	8.85	7.90
Detroit	3.45	4.50	5.004	3.70	4.659 ¹⁷	3.609	3.661	3.45	3.80	8.08	7.18	7.159	8.208
Cincinnati	3.425	4.475 ³	4.825 ⁸	3.675	4.711	3.611	3.691	3.811	4.011	.....	.....	.....	.....
St. Louis	3.397	4.347 ³	5.172 ⁴	3.747	4.931 ¹⁷	3.697	3.697	3.847	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	8.85	8.85	7.90
St. Paul	3.51	4.48	5.257 ⁴	3.86	4.351 ⁷	3.811 ³	3.811 ³	3.761 ³	4.361	8.09	7.19	7.561	8.711
Omaha	3.866	5.443	5.608 ⁴	4.215	4.165	4.165	4.115	4.43	.....	.....	.....	.....	.....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	8.08	7.18	7.18	8.23
Birmingham	3.45	.....	4.75	3.70	.....	3.55	3.55	3.50	4.43	.....	.....	.....	.....
Memphis	3.965 ⁷	4.68	3.265	4.215	.....	4.065	4.065	4.015	4.33	.....	.....	.....	.....
New Orleans	4.058 ⁸	4.95	5.358	4.308	.....	4.158	4.158 ⁹	4.108 ⁹	4.629	.....	.....	.....	.....
Houston	3.763	5.573	6.313 ³	4.313	.....	4.25	4.25	3.75	4.373 ³	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 ³	6.104	4.95	5.813 ¹⁸	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.484
San Francisco	4.651 ⁴	7.30 ⁴	6.354	4.5014	7.333 ¹⁷	4.651 ⁴	4.351 ⁴	4.151 ⁴	5.333	8.304	9.404	9.404	10.484
Seattle	4.651 ²	7.05 ⁴	5.954	4.251 ²	.....	4.751 ²	4.451 ²	4.351 ²	5.783	.....	.....	.....	.....
Portland	4.651 ¹	8.60 ⁴	5.754	4.751 ¹	.....	4.751 ¹	4.451 ¹	4.451 ¹	5.533	8.304	9.404	9.404	9.404
Salt Lake City	4.531 ⁷	.....	6.171 ⁸	5.531 ⁷	.....	4.981 ⁷	4.981 ⁷	4.881 ⁷	5.90	.....	.....	.....	.....

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designa- tion	Basic Open-Hearth		Electric Furnace		Designa- tion	Basic Open-Hearth		Electric Furnace		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs				
NE 1330	0.10¢	\$2.00	.....	.....	NE 9415	0.75¢	\$15.00	\$1.25	\$25.00	.....	.....	.....	.....
NE 1335	8.10	2.00	.....	.....	NE 9417	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 1340	0.10	2.00	.....	.....	NE 9420	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 1345	0.10	2.00	.....	.....	NE 9422	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 1350	0.10	2.00	.....	.....	NE 9425	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 8612	0.66¢	\$13.00	\$1.15	\$23.00	NE 9432	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 8615	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 8617	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 8620	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00	.....	.....	.....	.....
NE 8622	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00	.....	.....	.....	.....
NE 8625	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00	.....	.....	.....	.....
NE 8627	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00	.....	.....	.....	.....
NE 8630	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00	.....	.....	.....	.....
NE 8632	0.65	13.00	1.15	23.00	NE 9474	0.85	13.00	1.15	23.00	.....	.....	.....	.....
NE 8635	0.65	13.00	1.15	23.00	NE 9475	0.85	13.00	1.15	23.00	.....	.....	.....	.....
NE 8637	0.65	13.00	1.15	23.00	NE 9722	0.65¢	\$13.00	\$1.15	\$23.00	.....	.....	.....	.....
NE 8640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8712	0.70¢	\$14.00	\$1.20	\$24.00	NE 9763	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8715	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00	.....	.....	.....	.....
NE 8717	0.70	14.00	1.20	24.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
NE 8720	0.70	14.00	1.20	24.00	NE 9830	\$1.30	\$26.00	\$1.80	\$36.00	.....	.....	.....	.....
NE 8722	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8725	0.70	14.00	1.20	24.00	NE 9935	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8727	0.70	14.00	1.20	24.00	NE 9937	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8730	0.70	14.00	1.20	24.00	NE 9937	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8732	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8735	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8737	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8740	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8742	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00	.....	.....	.....	.....
NE 8745	0.70	14.00	1.20	24.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
NE 8747	0.70	14.00	1.20	24.00	NE 9912	\$1.20	\$24.00	\$1.55	\$31.00	.....	.....	.....	.....
NE 8750	0.70	14.00	1.20	24.00	NE 9915	1.20	24.00	1.55	31.00	.....	.....	.....	.....
NE 9255	0.40¢	\$8.00	.....	.....	NE 9917	1.20	24.00	1.55	31.00	.....	.....	.....	.....
NE 9260	0.40	8.00	.....	.....	NE 9920	1.20	24.00	1.55	31.00	.....	.....	.....	.....
NE 9261	0.65	13.00	.....	.....	NE 9922	1.20	24.00	1.55	31.00	.....	.....	.....	.....
NE 9262	0.65	13.00	.....	.....	NE 9925	1.20	24.00	1.55	31.00	.....	.....	.....	.....
					NE 52100A	.....	.....	\$2.60	\$52.00	.....	.....	.....	.....
					NE 52100B	.....	.....	2.60	52.00	.....	.....	.....	.....
					NE 52100C	.....	.....	2.60	52.00	.....	.....	.....	.....

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb., irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill... \$31.00
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown \$36.00
Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh \$45.00
Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$1.20 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton

Rerolling \$34.00
Forging quality 40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton \$54.00
Price delivered Detroit \$2.00 higher; E. Michigan, \$3.00 higher.

Shell Steel

Per Gross Ton

3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton

Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared .. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland ... 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed 67c.
Straight molybdenum 54c.
Tungsten-molybdenum 57 1/2c.
High-carbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 2c. higher.

Ultimate Simplicity in Dust Control . . .

Today there is a valuable premium on simplicity of operation and maintenance, which applies to all equipment. In dust control equipment, Schneible Multi-Wash Dust Collectors are the ultimate in simplicity.

The duties in connection with dust collectors are thus tabulated in the book "1,021 Answers to Industrial Health and Safety Problems."

(1) Regular inspection of the entire system, with complete maintenance and part replacement.

Maintenance and inspection are minimized with Schneible Multi-Wash Dust Collectors. They have no parts to clean, break, burn or wear rapidly.

(2) Adequate lubrication of the fan and other moving parts.

There are no moving parts in a Schneible Collector.

(3) Operation of the system in accordance with the directions of the designing engineer and the equipment manufacturer.

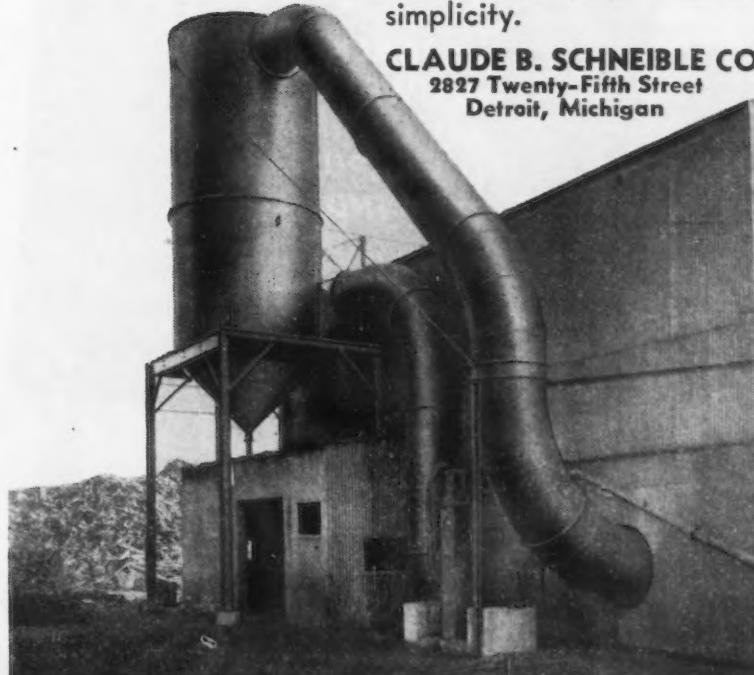
No operating attention is needed for a Schneible Collector. Start the motor, and it runs indefinitely.

(4) Regular reporting to supervision on wear, non-use or abuse of the system.

Reports on Schneible Collectors are minimized. They are fool-proof, trouble-free and have no moving parts.

A Schneible Multi-Wash Collector will function faithfully 24 hours a day, year in and year out, without attention; and do a constant, highly efficient, thorough job of dust and fume removal. Made in several types and in multiple units to control dust and fumes in an entire plant, or in units to control a single troublesome dust and fume creating operation. Submit your dust and fume problem to Schneible engineers for the ultimate in dust and fume control simplicity.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth Street
Detroit, Michigan

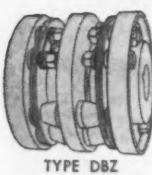


SCHNEIBLE



THOMAS

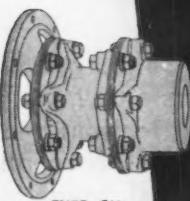
flexible COUPLINGS
FOR any SPEED OR SERVICE



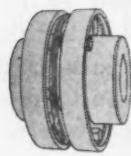
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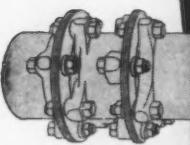
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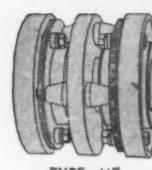
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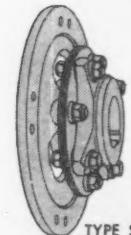
TYPE ST



TYPE AM



TYPE MT

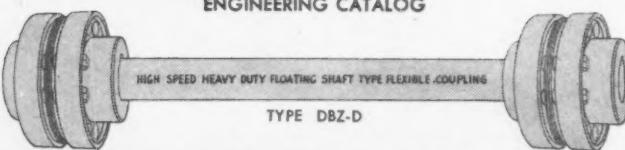


TYPE SS

NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT

These are the five essential features of Thomas Flexible Couplings that insure a permanent care-free installation.

WRITE FOR COMPLETE
ENGINEERING CATALOG



THE THOMAS PRINCIPLE ELIMINATES CHAINS,
SPUR GEARS and other VIBRATING MAKESHIFTS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63 ½	61
¾ in.	66 ½	55
1 to 3 in.	68 ½	57 ½

Wrought Iron (Butt Weld)

½ in.	24	3 ½
¾ in.	30	10
1 and 1 ¼ in.	34	16
1 ½ in.	38	18 ½
2 in.	37 ½	18

Steel (Lap Weld)

2 in.	61	49 ½
2 ½ and 3 in.	64	52 ½
3 ½ to 6 in.	66	54 ½

Wrought Iron (Lap Weld)

2 in.	30 ½	12
2 ½ to 3 ½ in.	31 ½	14 ½
4 in.	33 ½	18
4 ½ to 8 in.	32 ½	17

Steel (Butt, extra strong, plain ends)

½ in.	61 ½	50 ½
¾ in.	65 ½	54 ½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19 ½

Steel (Lap, extra strong, plain ends)

2 in.	59	48 ½
2 ½ and 3 in.	63	52 ½
3 ½ to 6 in.	66 ½	56

Wrought Iron (Same as Above)

2 in.	33 ½	15 ½
2 ½ to 4 in.	39	22 ½
4 ½ to 6 in.	37 ½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25% and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.30
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3% per cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

Lap Seamless Weld, Cold Hot Drawn Rolled Rolled	Base
2 in. o.d. 18 B.W.G. 15.03	13.04 12.38
2 ½ in. o.d. 18 B.W.G. 20.81	17.54 16.58
3 in. o.d. 12 B.W.G. 22.48	19.50 18.35
3 ½ in. o.d. 11 B.W.G. 28.37	24.62 23.15
4 in. o.d. 10 B.W.G. 35.20	30.54 28.66

(Extras for less carload quantities)	Base
40,000 lb. or ft. and over	5%
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago,
Cleveland, Birmingham, Duluth

	Pacific Coast Base per Keg	Pacific Coast Base per 100 lb.
Named Points	Named Points†	Base Column
Standard wire nails	\$2.55	\$2.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	
Annealed fence wire	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
Woven wire fence*	.67	.85
Fence posts, carloads	.69	.86
Single loop bale ties	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire	.70	

*15 1/2 gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
1/8 in. & smaller x 6 in. & shorter	65 1/2
3/16 & 5/16 in. x 6 in. & shorter	63 1/2
1/4 to 1 in. x 6 in. shorter	61
1 1/4 in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed: (Hexagon or Square)

1/8 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/4 to 1 1/2 in. inclusive	57
1 1/4 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

	Base discount less keg lots
7/16 in. and smaller	64
1/2 in. and smaller	62
1/2 in. through 1 in.	60
9/16 in. through 1 1/4 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/4 in. and larger	56

In full keg lots, 10 per cent additional discount.

Stove Bolts Consumer

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (1/2 in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets (7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws Consumer

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	58
Fillister head cap, listed sizes	51
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

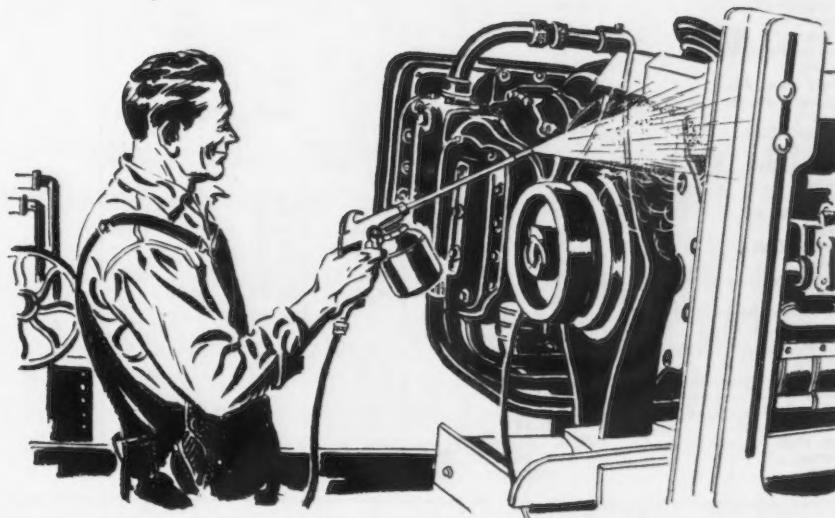
ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
30-lb. coating I.C.	7.50	15.00

TECTYL SEALS METAL

AGAINST **RUST** FOR
AS LONG AS TWO YEARS



One Quick, Easy Application

—by spraying, dipping, brushing or flushing—covers metal surfaces with a thin film that seals out moisture, eliminating all possibility of rust or corrosion damage. The film is transparent, so that you can SEE its protection at any time. A little Tectyl covers a LOT of metal, and can be removed in a few minutes with kerosene.

One of Five Specialized Types

will fit your special need—whether it be protecting raw materials or finished products, inside or outdoors, or in production uses. Easy to apply and remove, economical to use, Tectyl protection is *positive*. Write now, indicating your corrosion problem, and we will send you a Tectyl bulletin with complete application data—Tectyl will save you money and man-hours.

TECTYL Stops Rust

VALVOLINE OIL COMPANY

Fine Lubricating Oils Since 1866

468 Culvert Street

Cincinnati 2, Ohio

Refinery at Butler, Pennsylvania

New York - Atlanta - Detroit - Chicago - Los Angeles - Vancouver - Washington, D.C.

PRICES

PIG IRON

All prices set in bold face type are maximum established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn	27.50	27.00	28.00	.....	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia (4)	25.84	25.34	26.84	26.34	\$30.74	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedenland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steeltown, Pa.	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	25.11	24.61	25.11	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	32.69	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	32.86	.....
St. Louis	24.50	24.50	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	35.66	\$37.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	32.42	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	32.42	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	34.00	.....
Lyles, Tenn., fc. (2)	.....	.....	.....	.....	33.00	.....
St. Paul	26.63	26.13	27.1	26.61	39.80	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	26.95	.....	.....	.....	.....	.....
San Francisco	26.95	.....	.....	.....	.....	.....
Seattle	26.95	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....
GRAY FORGE IRON: Valley or Pittsburgh furnace						\$23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron & Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co., Birdsboro, Pa., permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh 21 1/2 to 23 1/4c.

Copper, reduced, 150 and 200 mesh 20 1/2 to 25 1/4c.

Iron, commercial, 100 and 200 mesh 96 + % Fe 13 1/2 to 15c.

Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots 4c.

Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots 63c.

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33c.

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe 42c.

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe 90c.

Aluminum, 100 and 200 mesh .23 to 27c.

Antimony, 100 mesh 20.6c.

Cadmium, 100 mesh \$1

Chromium, 150 mesh \$1.03

Lead, 100, 200 & 300 mesh, 11 1/2 to 12 1/4c.

Manganese, 150 mesh 51c.

Nickel, 150 mesh 51 1/4c.

Solder powder, 100 mesh, 8 1/2c. plus metal

Tin, 100 mesh 58 1/2c.

Tungsten metal powder, 98%

99%, any quantity, per lb. \$2.60

Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. \$2.60

Under 100 lb. \$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven) Net Ton

Connellsville, Pa. \$7.00*

Foundry, beehive (f.o.b. oven) 8.10

Fayette Co., W. Va. 8.25

Connellsburg, Pa. 8.25

Foundry, By-Product 13.35

Chicago, del'd 12.60

New England, del'd 14.25

Kearny, N. J., f.o.b. 12.65

Philadelphia, del'd 12.88

Buffalo, del'd 13.00

Portsmouth, Ohio, f.o.b. 11.10

Painesville, Ohio, f.o.b. 11.75

Erie, del'd 12.75

Cleveland, del'd 12.80

Cincinnati, del'd 12.85

St. Louis, del'd 13.85

Birmingham, del'd 10.50

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.



"Unskilled labor adds nothing to a product except cost."
Ezra W. Clark

PRICES

REFRACTORIES (F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Sec. quality, New Jersey	51.00
No. 1 Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania and Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

Per Net ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00
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Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	\$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00

Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plate, steel	2.15c.
Tie plates, Pacific Coast	2.80c.
Track bolts	4.75c.

Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	53.5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.	
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CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

No. 304	No. 302
Forging billets	21.25c.
Bars	25.00c.
Plates	29.00c.
Structural shapes	25.00c.
Sheets	36.00c.
Hot rolled strip	23.50c.
Cold rolled strip	30.00c.
Drawn wire	26.00c.
	34.00c.

Straight-Chromium Alloys

No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.
Bars	18.50c.	19.00c.	22.50c.
Plates	21.50c.	22.00c.	25.50c.
Sheets	26.50c.	29.00c.	32.50c.
Hot strip	17.00c.	17.50c.	24.00c.
Cold strip	22.00c.	22.50c.	32.00c.

Chromium-Nickel Clad Steel (20%)

No. 304	
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.35c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.
F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.	



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By A. LESCHEN & SONS ROPE CO. Established 1857
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A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

HEAT-TREATED STEEL SHOT

We manufacture
shot and grit for
endurance

Heat-Treated Steel Shot and
Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



MACHINED BRONZE BEARINGS GRAPHITED AND OILLESS BRONZE BEARINGS BRONZE GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from $\frac{3}{8}$ " in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

If it's Bronze

INDUSTRIAL



We make it

BEARINGS

S. & H. Bearing and Manufacturing Co.

340-344 North Avenue, East

Cranford

New Jersey



THE use of worm gear speed reduction in Reading Electric Hoists allows you to fit the hoist to your plant layout subject to local conditions of clearance, space available, etc. These hoists are composed of four interchangeable units — suspension unit, hoisting unit, motor unit and control unit. Under this Reading Unit

Construction Plan, 144 different combinations of these units are available to give you special equipment at the low cost of standard parts.

Other advantages of this worm gear construction are: quiet operation, compact size, and low cost of maintenance because of only three moving units in the hoisting mechanism.

It will pay you to investigate the money saving features of Reading Electric Hoists. For full technical information, write for Bulletin 1004.

READING CHAIN & BLOCK CORPORATION
2101 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS • OVERHEAD TRAVELING CRANES

READING HOISTS

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
Carload lots (bulk) \$135.00
Carload lots (packed) 141.00
Less ton lots (packed) 148.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 36c.
L.c.l. lots 38c.
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
Carload, bulk 34c.
L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Carloads \$35.00 \$36.00
Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si	8.90c.	9.05c.	9.55c.
90-95% Si	11.05c.	11.20c.	11.65c.

Spot sales add: 4c. per lb. for 50% Si, 3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$t)
F.o.b. Jackson, Ohio \$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese add over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb. packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-car-load	3.8c.	4.2c.	4.35c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

	Eastern Zone	Central Zone	Western Zone
2000 lb. to carload	5.70c.	6.90c.	7.30c.
Under 2000 lb.	5.80c.	6.30c.	6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% Cr	23.00c.	23.40c.	24.00c.
0.10% Cr	22.50c.	22.90c.	23.50c.
0.15% Cr	22.00c.	22.40c.	23.00c.
0.20% Cr	21.50c.	21.90c.	22.50c.
0.50% Cr	21.00c.	21.40c.	22.00c.
1.00% Cr	20.50c.	20.90c.	21.50c.
2.00% Cr	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C	13.50c.	13.90c.	14.50c.

PRICES

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

Carloads, Ton Less
Bulk Lots Ton

0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

Eastern Central Western

Zone	Zone	Zone
Carload, bulk..	8.25c.	8.55c.
Ton lots ..	8.75c.	9.25c.
Less ton lots ..	9.00c.	9.50c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

Eastern Central Western

Zone	Zone	Zone
Carload, bulk ..	6.05c.	6.30c.
Ton lots ..	6.55c.	7.55c.
Less ton lots ..	6.80c.	7.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

Eastern Central Western

Zone	Zone	Zone
Carloads ..	15.50c.	16.00c.
Ton lots ..	16.50c.	17.35c.
Less ton lots ..	17.00c.	17.85c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.4c. for Western Zone.

Cast Turnings Distilled

Ton lots ..	\$1.80	\$2.30	\$5.00
Less ton lots ..	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot

45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern Central Western

Zone	Zone	Zone
Ton lots ..	\$1.20	\$1.2075
Less ton lots ..	1.30	1.3075

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe,

1.50% max. Si, 3.00% max. C.

Eastern Central Western

Zone	Zone	Zone
Ton lots ..	\$1.89	\$1.903
Less ton lots ..	2.01	2.023

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max.

Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Eastern Central Western

Zone	Zone	Zone
11,200 lb.		
or more ..	\$1.90	\$1.9125

Ton lots .. 2.00 2.0125 2.0445

Less ton lots 2.10 2.1125 2.1445

Other Ferroalloys

Ferrotungsten, Standard grade, lump or $\frac{1}{4}$ X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more... \$1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth

Crucible

Primos

\$2.70

\$2.80

\$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal... \$1.50

Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5 . Spot sales add 5c. per lb. contained V_2O_5 \$1.10

Ferroboron, contract basis, 17.50% min., Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.

2000 lb. to carload.....

Under 2000 lb.....

\$1.20

1.30

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots

2000 lb. to carload.....

25c.

26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots

2000 lb. to carload.....

58c.

59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1

No. 6

No. 79

87.5c.

60c.

45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb.....

Less ton lots, per lb.....

45c.

50c.

Ferrotitanium, 40%-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti.

Less ton lots

\$1.23

\$1.25

Ferrotitanium, 20%-25%, 0.10% C, max., ton lots, per lb. contained titanium.

Less ton lots

\$1.35

\$1.40

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.... \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton..... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalled with Nashville, per gross ton..... \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langelo, Washington, Pa., any quantity, per lb. contained Mo.

Calcium molybdenum, 40%-45%, f.o.b. Langelo and Washington, Pa., any quantity, per lb. contained Mo.

Molybdenum oxide briquettes, 48-52% Mo, f.o.b. Langelo, Pa., per lb. contained Mo.

Molybdenum oxide, in cans, f.o.b. Langelo and Washington, Pa., per lb. contained Mo.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 4c. for spot sales

Carload lots

14c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk

4.6c.

Simanal (approx. 20% Si, 10% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

5.75c.

7.25c.

Car lots

8.75c.

9.25c.

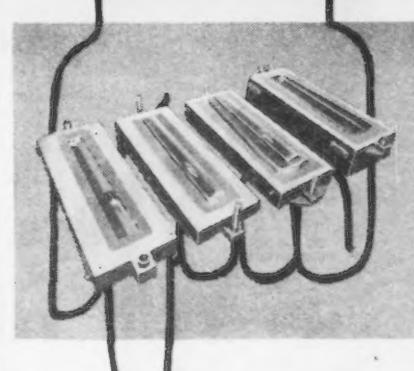
STRENES

METAL

POINTS

THE

WAY



Here are a couple of Strenes case histories

that may suggest a

civilian production a little faster.

Tractor Top-Dies

Strenes Metal—cast-to-shape—was specified for stamping tractor hood tops. An accurate cost check showed a saving of around 50% in machining time due to the cast-to-shape construction. On re-conversion tooling rush, such a saving will be highly advantageous.

Hydrator Pan Die

Dies of Strenes Metal stand up, too. One refrigerator hydrator pan die, for instance, stamped 2,000,000 parts with a $3\frac{1}{2}$ " draw out of .50 material. And, due to the self-lubricating property of the metal, stoning and polishing operations were virtually unnecessary.

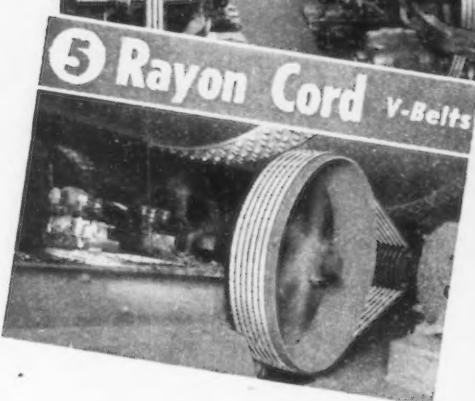
Both for civilian and war products, Strenes Metal has been a definite help on many tooling programs. Facts and figures on request. Write today.

Strenes Metal for drawing and forming dies.

The Advance Foundry Co.
100 Seminary Ave.,
DAYTON 3, OHIO

Strenes
METAL

Here are 5 TYPES of GATES V-BELTS



**ONE of these five types
Will Fit
Any Need You Have!**

Whenever a drive in your plant is wearing out belts faster than it should—or is giving any other trouble—just pick up your phone and call the Gates Rubber Engineer.

He can quickly analyze your problem and, in most cases, he can correct the trouble very easily without needing to specify the use of any special-structure belts.

There are service conditions, however, under which a V-Belt of special construction can most profitably be used—and your Gates Rubber Engineer can then supply a Gates V-Belt that is precisely engineered to meet the unusual conditions.

The Gates V-Belt of special synthetic rubber is a notable example. As a result of specialized research, Gates developed this synthetic rubber V-Belt and began supplying it in large quantities to industry more than six years ago. Under severe conditions of heat and oil, this Gates special synthetic V-Belt actually outwears any natural rubber belt by as much as 230%.

In your particular application, V-Belts with tension members composed of flexible steel cables

—or of rayon cords—may prove to be the most efficient and economical. Again, Gates Static-Safety V-Belts may best fit your special need.

In any case, the wisest move you can make is to phone the Gates Rubber Engineer. (Just look under "Gates Rubber" in your phone book.) He will come right to your plant—will thoroughly analyze any drive problem you may have—and he will always recommend the practice that will be most efficient and economical for you.

THE GATES RUBBER COMPANY
Engineering Offices and Stocks in All Large Industrial Centers

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DENVER 17, COLO.
999 South Broadway

DETROIT 4, MICH.
8663 Grand River Avenue

PORTLAND 9, ORE.
333 N. W. 5th Avenue

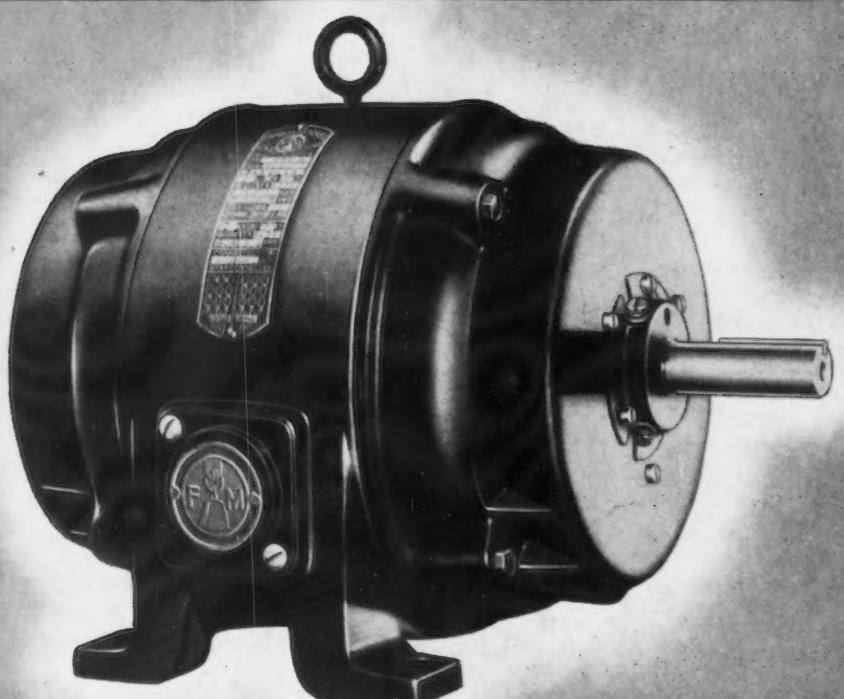
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DECEMBER 28, 1944

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The IRON AGE



FEATURES OF THE NEW Fairbanks-Morse GENERAL-PURPOSE MOTOR

- It is the motor of tomorrow, available today.
- It is a 40° C. motor.
- It is a protected frame motor.
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- It has cross-flow ventilation.
- It has ball bearings, sealed in and protected.
- It has the exclusive Fairbanks-Morse Copperspun Rotor.

A name worth remembering

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Motors • Pumps • Scales • Stokers • Magneto's • Railroad

Motor Cars, Standpipes • Farm Equipment

Buy More War Bonds

Motors

FAIRBANKS, MORSE & CO.
CHICAGO 5, ILLINOIS



Put **SPEEDAIRE** into your Picture for 1945

PICTURE the new Cleveland Speedaire Worm Gear Units on your equipment, and you picture new low costs for transmitting your power. Because Speedaire creates an entirely new standard of worm gear performance—and gives you *more horsepower for your dollar.*

Make your conversion effective, by applying Speedaire on all of the equipment you purchase next year. Speedaire is as modern as the newest machine you will install—as trustworthy as everything Cleveland has built for you since 1912.

We'll gladly send literature—or a District Representative. The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.



Affiliate:—The Farval Corporation, Centralized Systems of Lubrication
In Canada: PEACOCK BROTHERS LIMITED

SPEEDAIRE Pointers for your Design Engineer:—

1—Speedaire—the new Fan-Cooled Worm Gear Reduction Unit—continually removes heat by means of a high-velocity air stream scouring the surfaces of the oil reservoir.

2—Because Speedaire stays cool, it delivers up to twice the capacity of standard worm units of equal frame size, at usual motor speeds.

3—Speedaire can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle Drive.

4—Furnished in 6 standard sizes—from 3 to 95 H.P.

5—Speedaire incorporates design and construction fundamentals inherent in all Cleveland Worm Gear Units for more than 30 years.

Cleveland
SPEEDAIRE Worm Gear Reduction Units
FAN COOLED





When a crane takes a vacation... **IT'S EXPENSIVE**

Whether your crane rolls on wheels or crawls on treads, it's a big, powerful, friendly brute that's as willing as a St. Bernard dog—and even more responsive.

But, without those sinewy ropes on its various lines, the big fellow couldn't do a thing. So it's money in your pocket to see that the *right* ropes are there in the first place—ropes that stand up to the wear and tear and grief imposed by heavy loads and bending stresses.

By right ropes, we mean Purple Strand of the proper construction for this sort of work. When you buy Purple Strand, you're getting the toughest steel that ever goes into the making of rope—steel from selected heats that are closely controlled and supervised every step of the way by Bethlehem metallurgists. Purple Strand means premium quality from crown wire to core.

For hoisting, holding, and closing lines, you'll find that it pays to use Purple Strand Form-Set (pre-formed). The preforming process takes the "wildness"

out of a rope; makes it easier to bend around sheaves, and facilitates spooling. Even more important, it adds life to the rope by making it more flexible—hence less susceptible to bending fatigue.

That crane can be a mighty good friend when you need to move big loads in a hurry. If it's reeved with Purple Strand, you'll keep it on the job a lot longer.



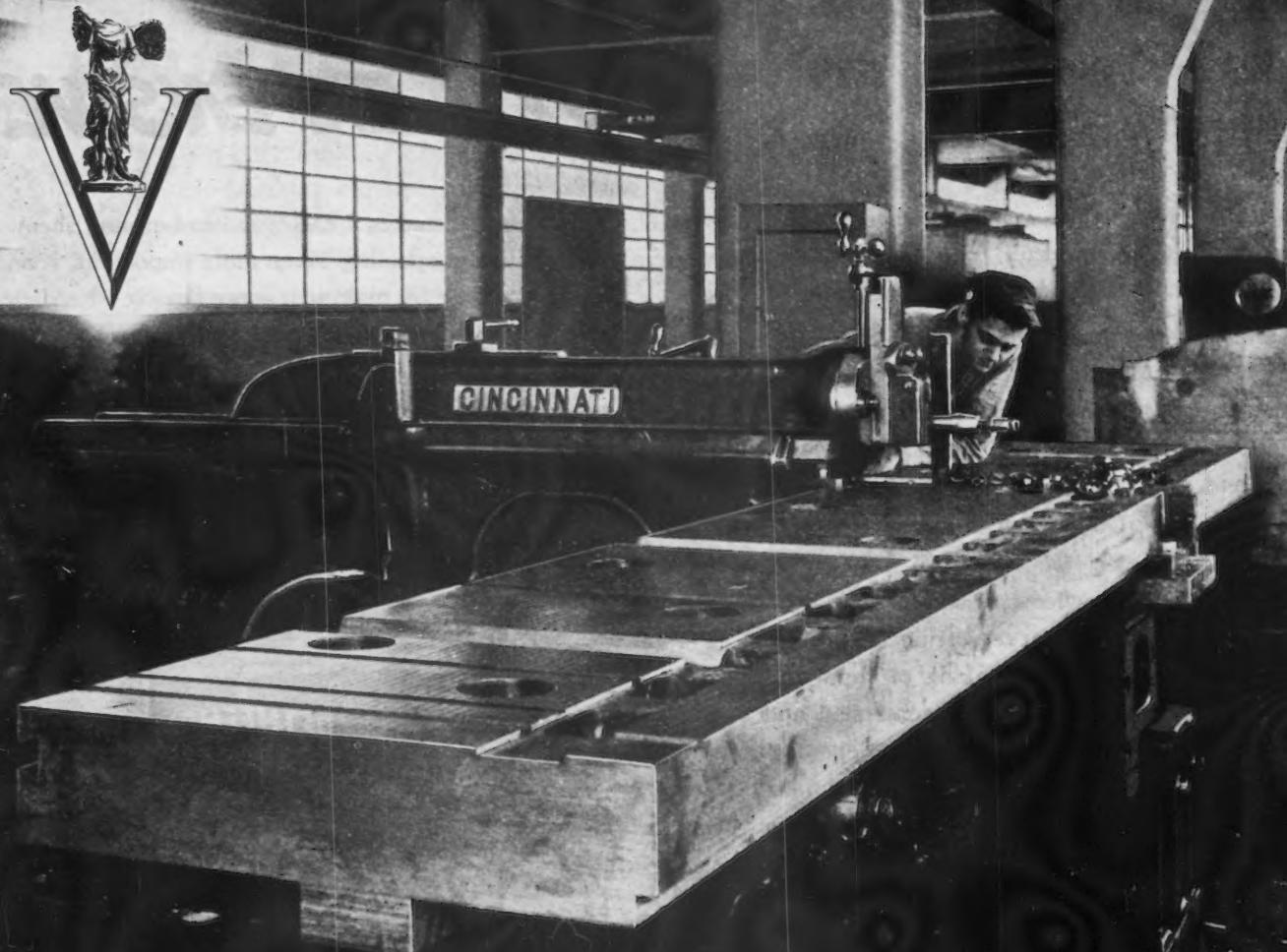
**When you think WIRE ROPE
... think BETHLEHEM**

THE CINCINNATI SHAPER CO.
CINCINNATI OHIO U.S.A.
SHAPERS BRAKES SHEARS

Shaping a 10,000 lb. Plate

The Shaper is recognized as indispensable in the toolroom—but many manufacturing jobs are best performed on Shapers. Whether shaping slots in a 10,000-lb. plate or contouring small parts, the power and accuracy of Cincinnati Shapers will meet your requirements.

Write for Catalog N-2





FAST MACHINING SPEEDS B-29 PRODUCTION



FREE! This 40-page booklet explains the why, where, when and what of cutting fluids. Contains many practical suggestions and recommendations to help you improve the speed and quality of your machining. Send for your copy today!

THE aluminum crankcases being machined here are for 2200-hp, 18-cylinder aircraft engines . . . giant power plants that help B-29 Superfortresses carry heavier bomb loads faster and farther than any bombers ever built.

Turning out airplane engine parts and other precision war materiel on a mass production basis requires faster machining, better finish, longer tool life . . . assured by the use of Texaco Cutting and

Soluble Oils. Texaco Cutting Oils lubricate the tools, carry away heat and prevent chip welding, thus lengthening tool life, assuring greater output.

The services of a Texaco Engineer specializing in cutting coolants are available to you through more than 2300 Texaco distributing points in the 48 States.

★ ★ ★

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO CUTTING, SOLUBLE AND HYDRAULIC OILS FOR FASTER MACHINING

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHTS ★ METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS

GROWTH THROUGH

Distinguished Service

SINCE 1889

IN EVERY INDUSTRY there are those who pioneer—those who set out, through constant study, research and experiment, to chart the course of progress down which others follow.

Fifty-five years ago, the newly-founded Peninsular organization elected to be a pioneer in the grinding wheel industry. Since that time, Peninsular has originated and contributed many new and important advancements in the fabrication of abrasive wheels—in the machinery for their manufacture—in the methods for their application to modern manufacturing problems.

To accomplish this has not been easy. It has taken time—money—and endless striving. But it

has brought its rewards. And chief of these is the steady, healthy growth that has brought the Peninsular Grinding Wheel Company to the position of leadership it enjoys today.

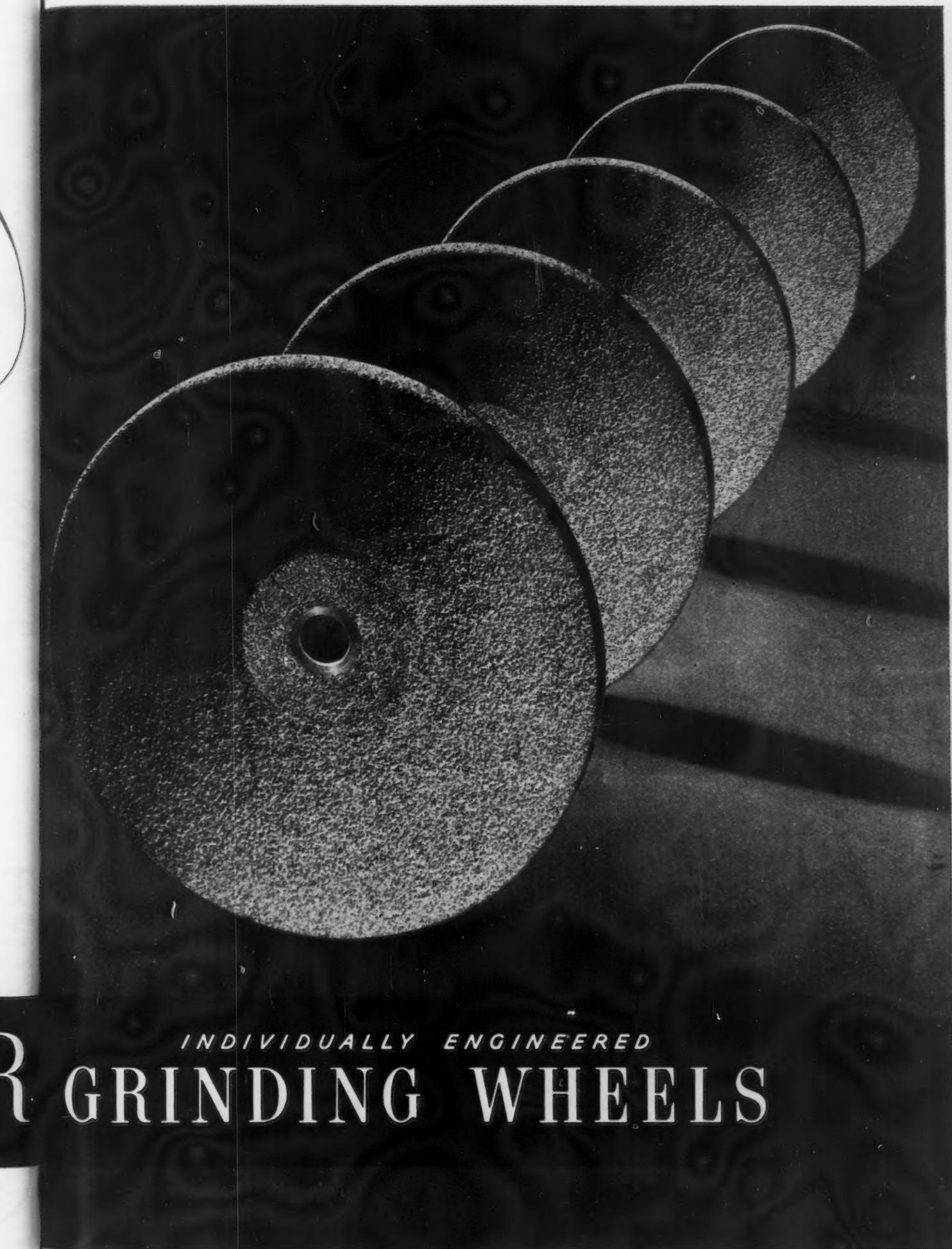
A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your postwar preparation—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7, Michigan. *Branch Offices:* Chicago, Cleveland, Newark, Pittsburgh.

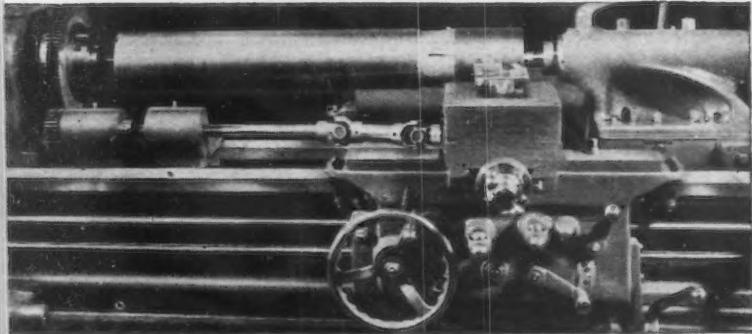
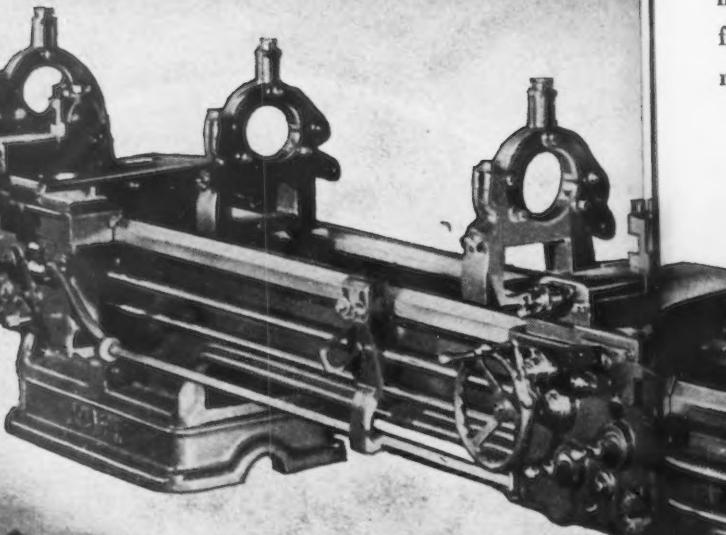
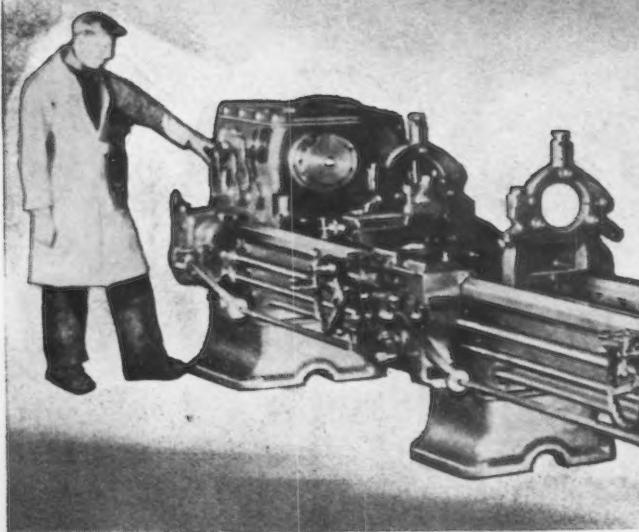
SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR
SINCE 1889



INDIVIDUALLY ENGINEERED
GRINDING WHEELS

To reduce your turning

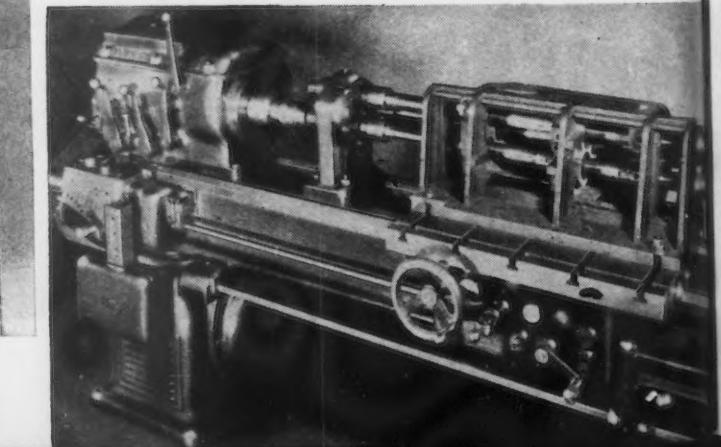
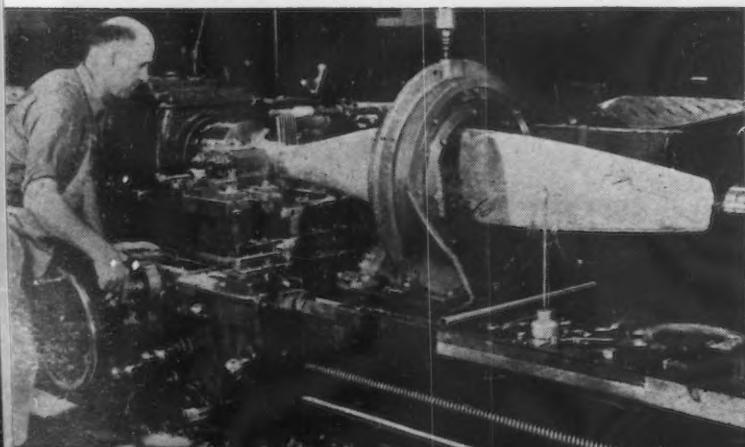


A special contour shape turning device on this standard Monarch lathe was developed to speed delivery of landing gear struts. A large number of these special Monarchs are used in all plants producing this work.

By using three carriages, operating simultaneously, two-thirds reduction in the machining time of periscope tubes was effected by this Monarch machine. The 40' bed is made in two sections, joined together as accurately as if made in one piece. Steady rests shown are standard Monarch units.

Machining the hub end of this propeller blade requires 13 tools, but is done in one setup on this Monarch lathe. One large propeller plant uses several of these lathes for this purpose.

One operator can handle several of these Monarch lathes, used in our own plant as horizontal boring machines. They are equipped with special type platen carriages, on which the work-holding boring fixtures are mounted. These machines reduce production costs and assure accurate duplication.



costs... SEE MONARCH

Illustrated here are a few of the many ingenious time-saving applications of standard or special Monarch lathes for war production. Postwar, machines such as these will more than pay their way by delivering increased output of high quality turning, boring or facing work. Especially, they will help offset higher man power costs. If you would like a demonstration

of how Monarch turning machines can be profitably applied to your work, our engineers are at your service.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

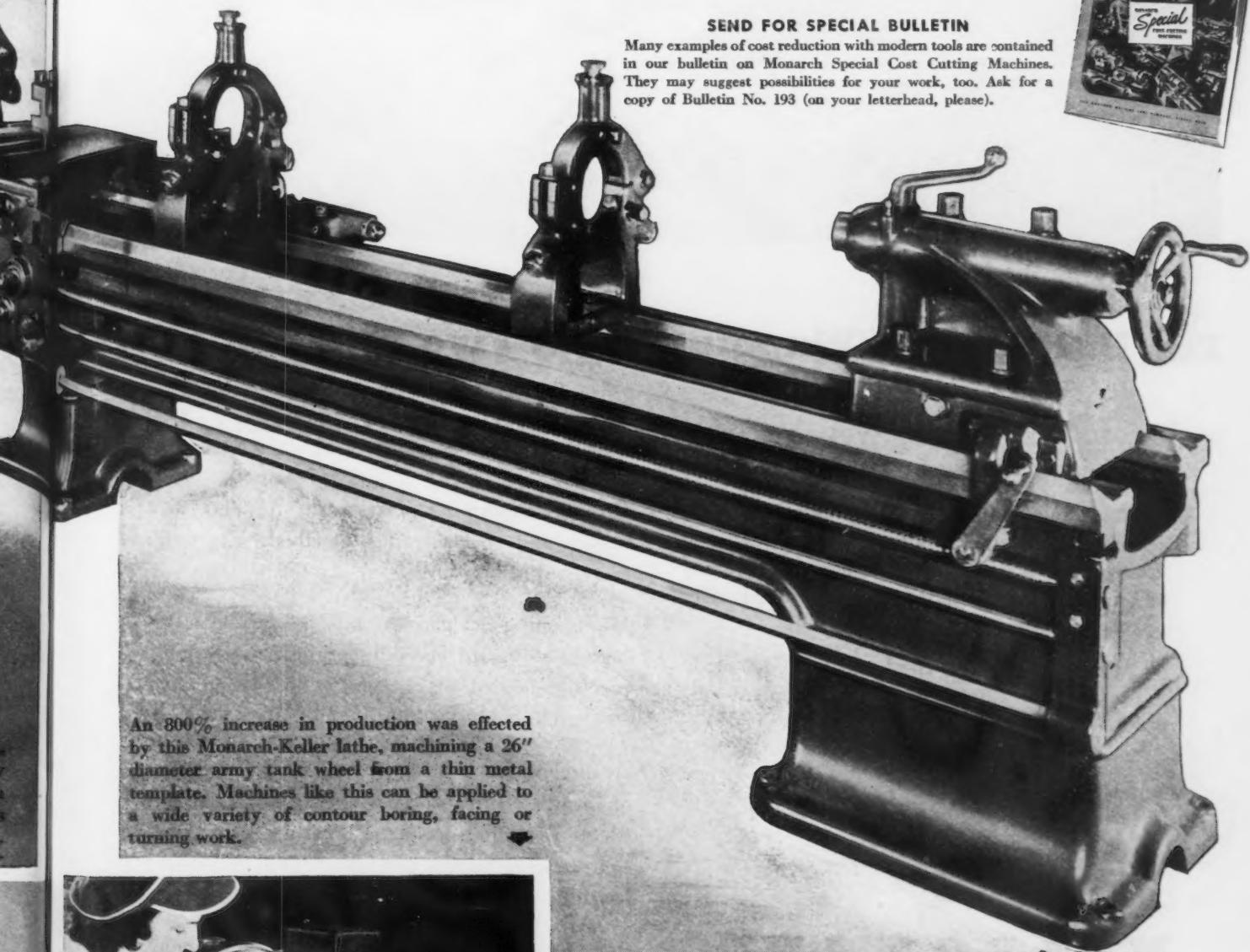
DIRECT FACTORY BRANCHES:

801 Fisher Bldg., Detroit 2, Mich. 10465 Carnegie Ave., Cleveland 6, Ohio
622 W. Washington Blvd., Chicago 6, Ill.
1060 Broad Street, Newark 2, N. J.
512 Empire Bldg., Pittsburgh 22, Pa.

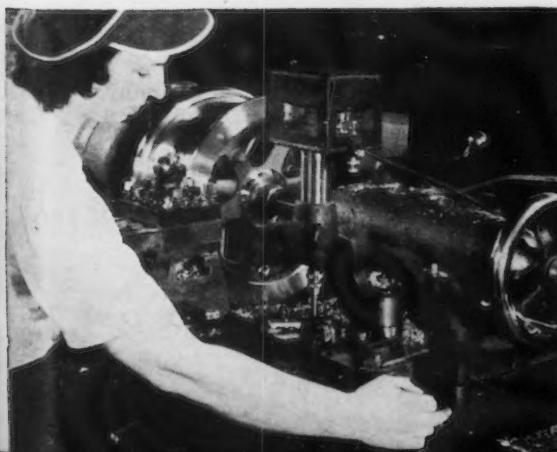
Representatives in principal cities

SEND FOR SPECIAL BULLETIN

Many examples of cost reduction with modern tools are contained in our bulletin on Monarch Special Cost Cutting Machines. They may suggest possibilities for your work, too. Ask for a copy of Bulletin No. 193 (on your letterhead, please).



An 800% increase in production was effected by this Monarch-Keller lathe, machining a 26" diameter army tank wheel from a thin metal template. Machines like this can be applied to a wide variety of contour boring, facing or turning work.



*Monarch
Saves Time*



For Hitting the "Pinpoint" from Five Miles Upstairs

Microhoning Provides Vital

High altitude bomb sights need a certain number of bearing surfaces of almost perfect precision accuracy and surface finish. The amazing accuracy of our bomb sights depends on this near-perfect accomplishment.

The thousands of these bomb sights needed made it necessary to achieve this fine instrument precision at production speed.

Ordinary machining practice can't produce such results—and fine instrument methods just aren't fast enough.

Microhoning bridged the gap. By means of this highly controlled abrading process, the extreme precision needed was obtained at production rates.

This modern final machining process will generate dimensional accuracy to "tenths" and fractions of "tenths", and provide any desired surface finish. It is applicable to the bores of these bomb sight bearings as it is to highly loaded gun turret bearings.

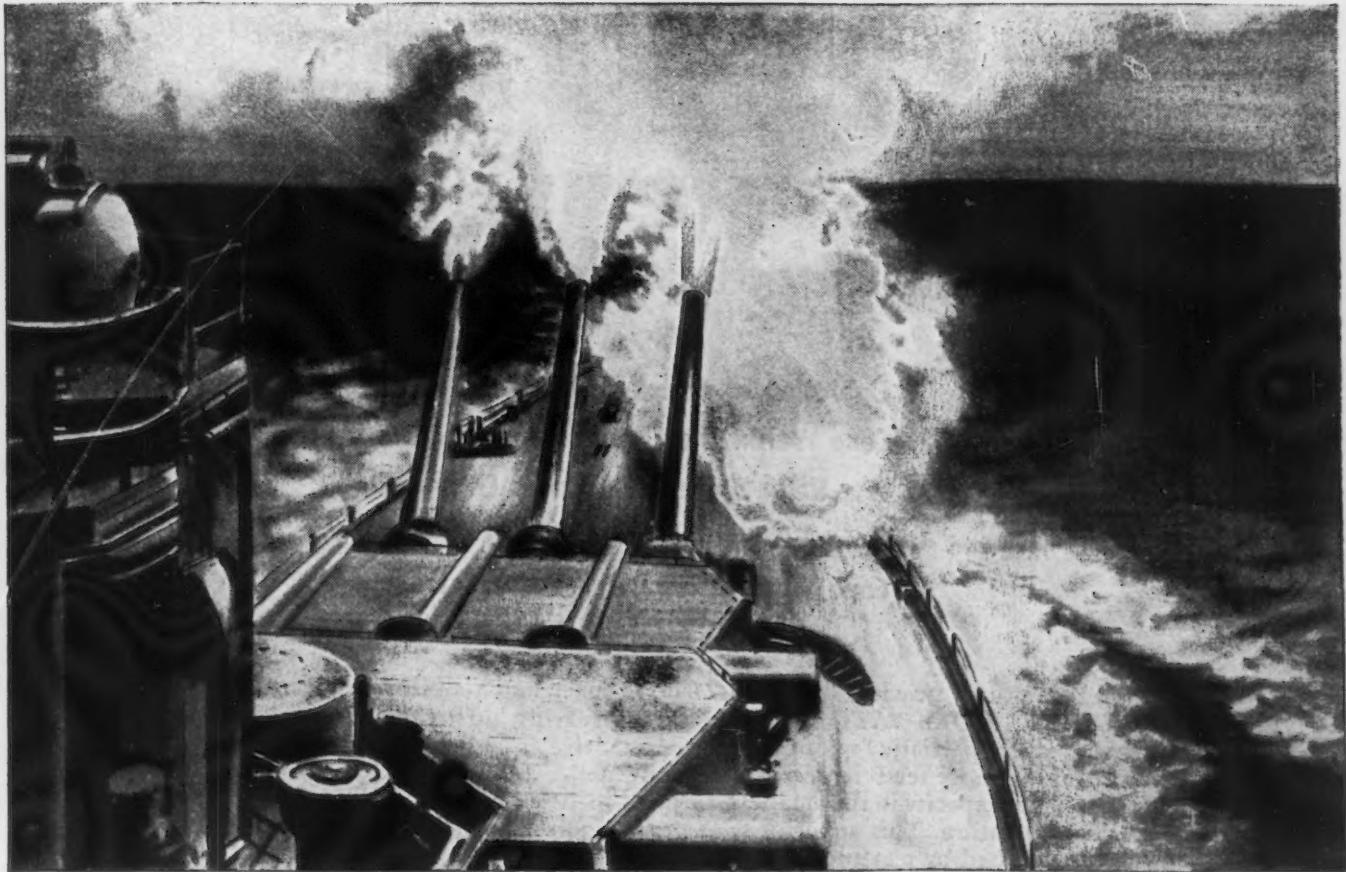
Precision Microfinish Honing will make many important contributions in postwar processing and Micromatic engineers will be ready with many new honing developments.



**M I C R O M A T I C
H O N E C O R P O R A T I O N**

DETROIT 4, MICHIGAN

MAKERS OF HONING MACHINERY TOOLS



. . . or Blasting a "Tin Can" Beyond The Horizon *Precision Bearings in Wartime Production*

A battleship gun turret is a complex precision instrument on a gigantic scale. Each complete turret weighs about 1550 tons—as much as an entire medium weight destroyer. This great mass must not only move smoothly, but also very rapidly—guns must be quickly targeted with extreme precision and without backlash. That calls for something extraordinary in the way of bearings.

They must be dependable and have amazing accuracy. Inaccuracy or the slightest imperfection of operating fit would destroy the telescope precision needed to make each shot count.

The best ordinary machining methods won't provide the precision nor the fine surface finish necessary for accurate frictionless operation.

Microhoning was found to be the answer. Micro-

honing is a process of final machining which generates average bore accuracy for roundness and straightness within .0002" to .0003"—which removes up to 65 cubic inches of stock per hour. In production of turret bearings—not only for battleships, but also for cruisers and destroyers—Microhoning has provided the desired combined precision and finish.

And, it will be more constructively useful in coming times of peace than it has been in war production.

MICROMATIC
HONE CORPORATION

DETROIT 4, MICHIGAN



MAKERS OF HONING MACHINE TOOLS

UNITED

HEAVY DUTY ROLL LATHES

Headstock Faceplate Directly Driven by "CONE WORM" Gears

Advantages

1. Operation at a Steady, Uniform Speed—"CHATTERLESS"
 2. Cone Worm Drive Permits Compact Construction
 3. Low Head Room—Facilitates Entry of Roll
 4. Motors Protected by Headstock
 5. Cone Worm Drive Rated Conservatively

The "Cone" type of worm gearing used in UNITED HEAVY-DUTY ROLL LATHES, with its hour-glass shape of worm partially "wrapping" the gear and thus bringing more teeth in constant contact, provides maximum capacity in the smallest space, and chatterless operation. This superiority has been definitely established by test and experience in UNITED 4-high mill screwdown applications.

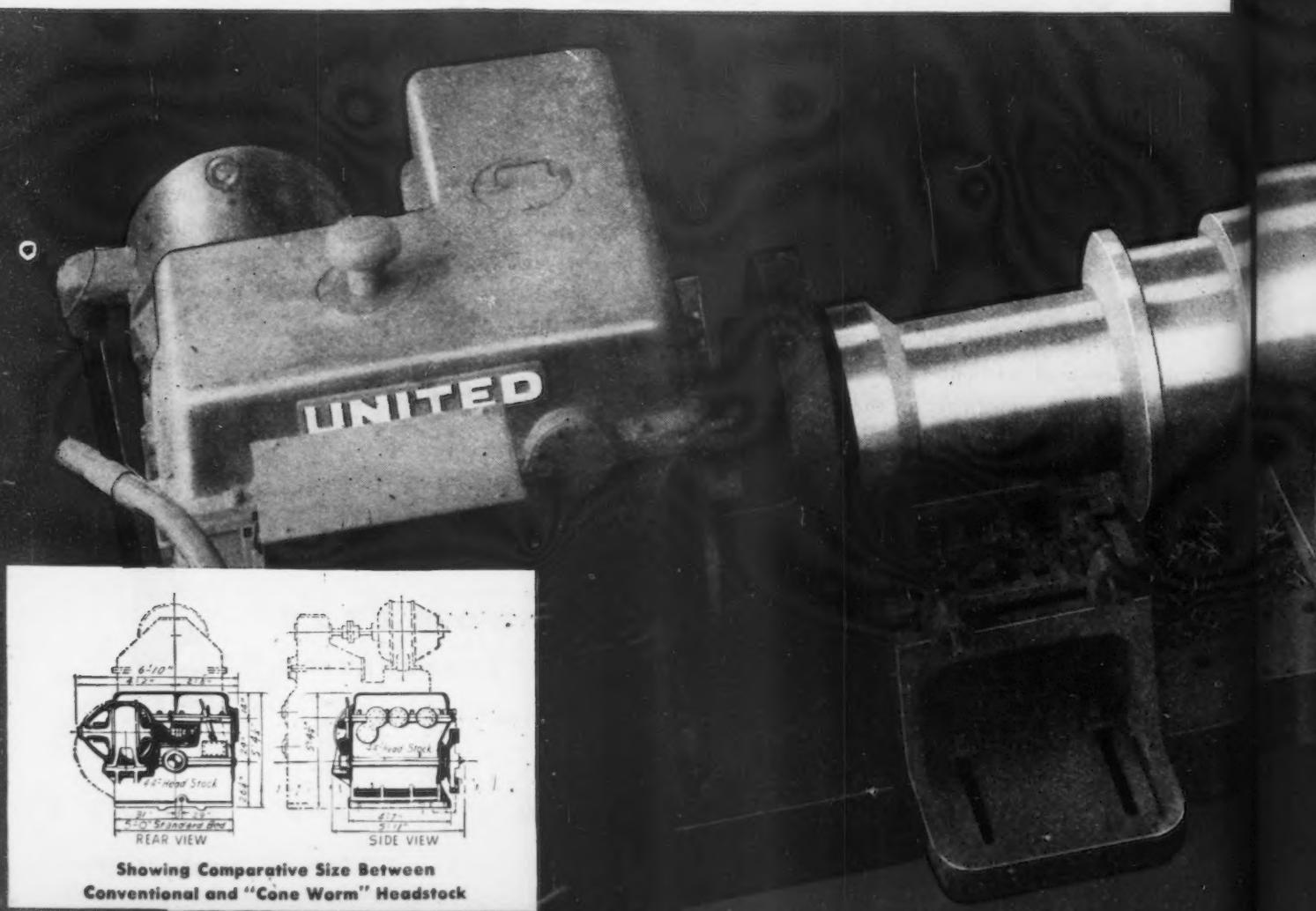
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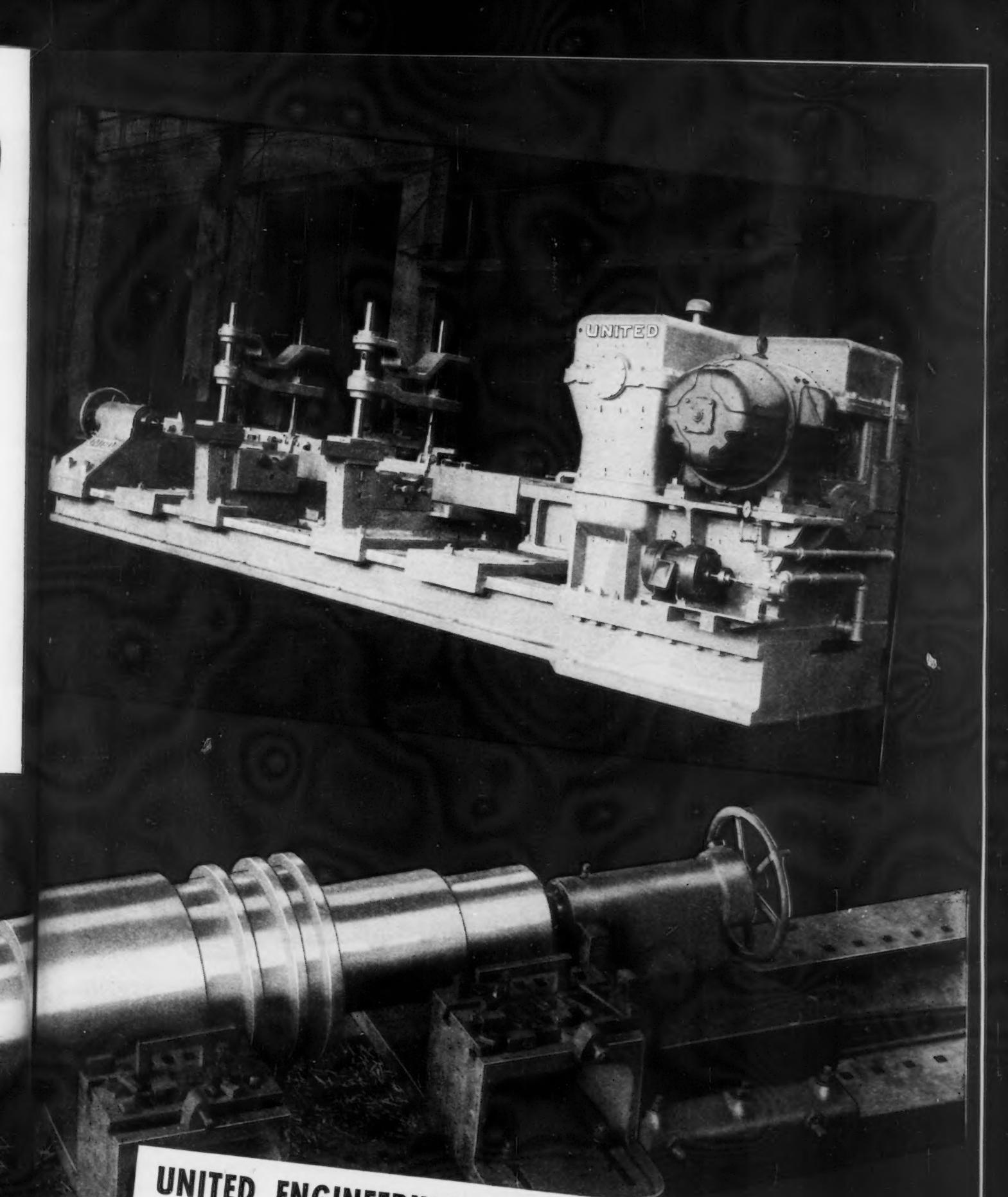
floor space and visibility between lathes.

All gearing up to the main cone worm face-plate drive is either single or double helical, is fully roller bearing mounted and carefully proportioned with reference to both velocity and load requirements. These fully enclosed gears and bearings are lubricated by forced oil circulation.

UNITED HEAVY-DUTY ROLL LATHES can be furnished for either "fixed" or "rotating" center.

Consult UNITED engineers for complete technical data.





UNITED ENGINEERING AND FOUNDRY COMPANY

Plants at PITTSBURGH, PENNSYLVANIA
PITTSTURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

Davy and United Engineering Company, Ltd., Sheffield, England
Dominion Engineering Works, Ltd., Montreal, P. Q. Canada

THE WORLD'S LARGEST DESIGNERS AND MAKERS OF ROLLS AND ROLLING MILL EQUIPMENT





For Hitting the "Pinpoint" from Five Miles Upstairs

Microboning Provides Vital

High altitude bomb sights need a certain number of bearing surfaces of almost perfect precision accuracy and surface finish. The amazing accuracy of our bomb sights depends on this near-perfect accomplishment.

The thousands of these bomb sights needed made it necessary to achieve this fine instrument precision at production speed.



**M I C R O M A T I C
H O N E C O R P O R A T I O N**

DETROIT 4, MICHIGAN

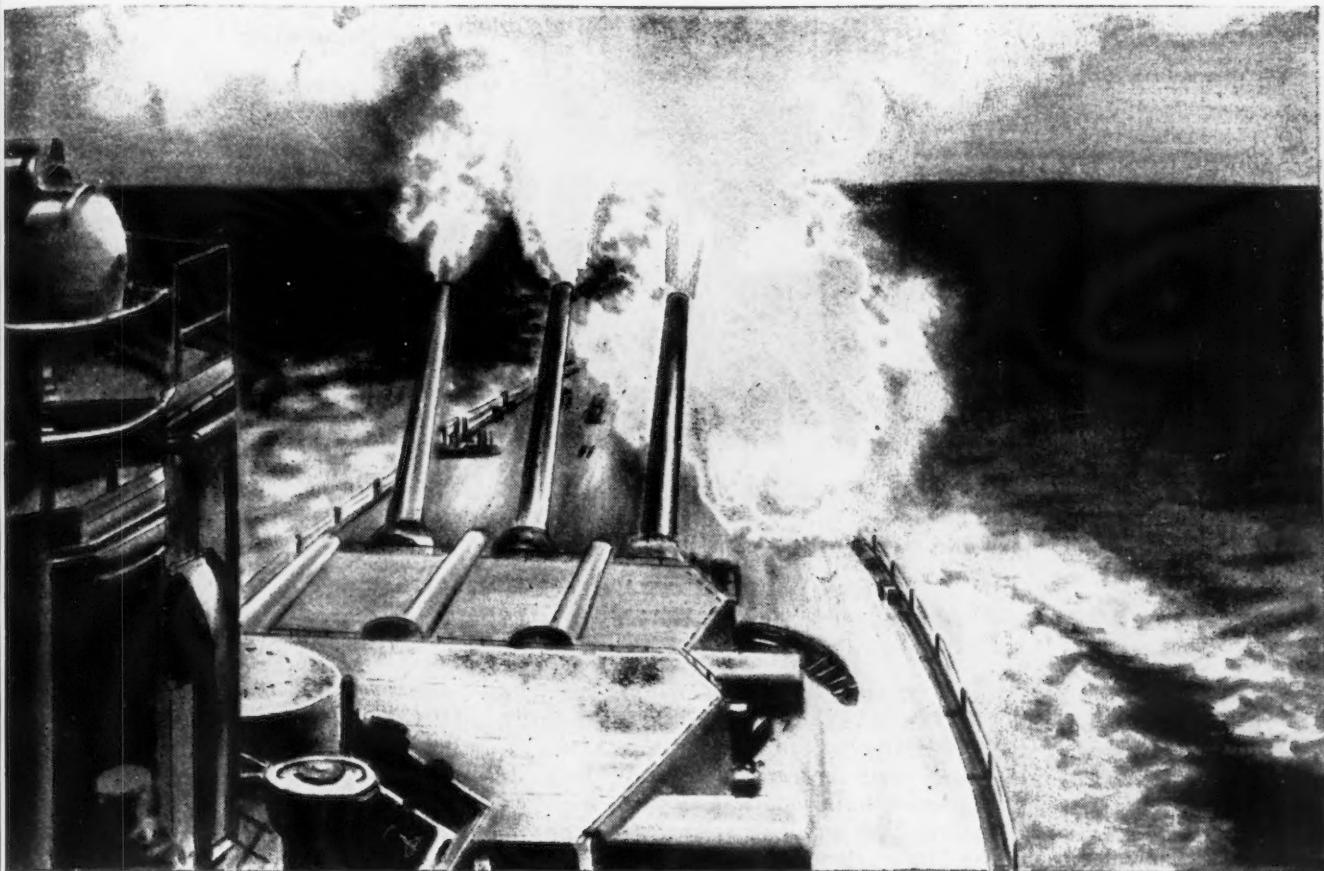
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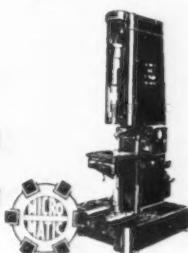
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MICROMATIC
HONE CORPORATION

DETROIT 4, MICHIGAN



M A K E R S O F H O N I N G M A C H I N E T O O L S

UNITED

HEAVY DUTY ROLL LATHES

Headstock Faceplate Directly Driven by "CONE WORM" Gears

Advantages



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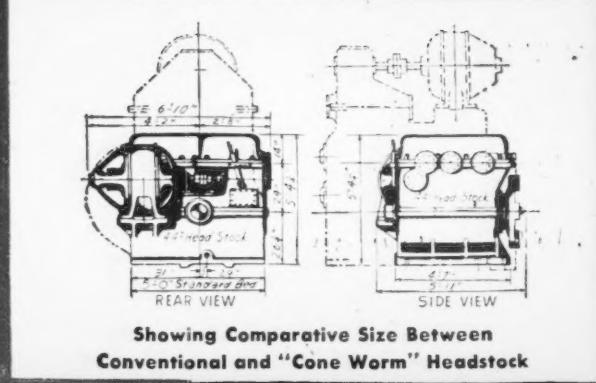
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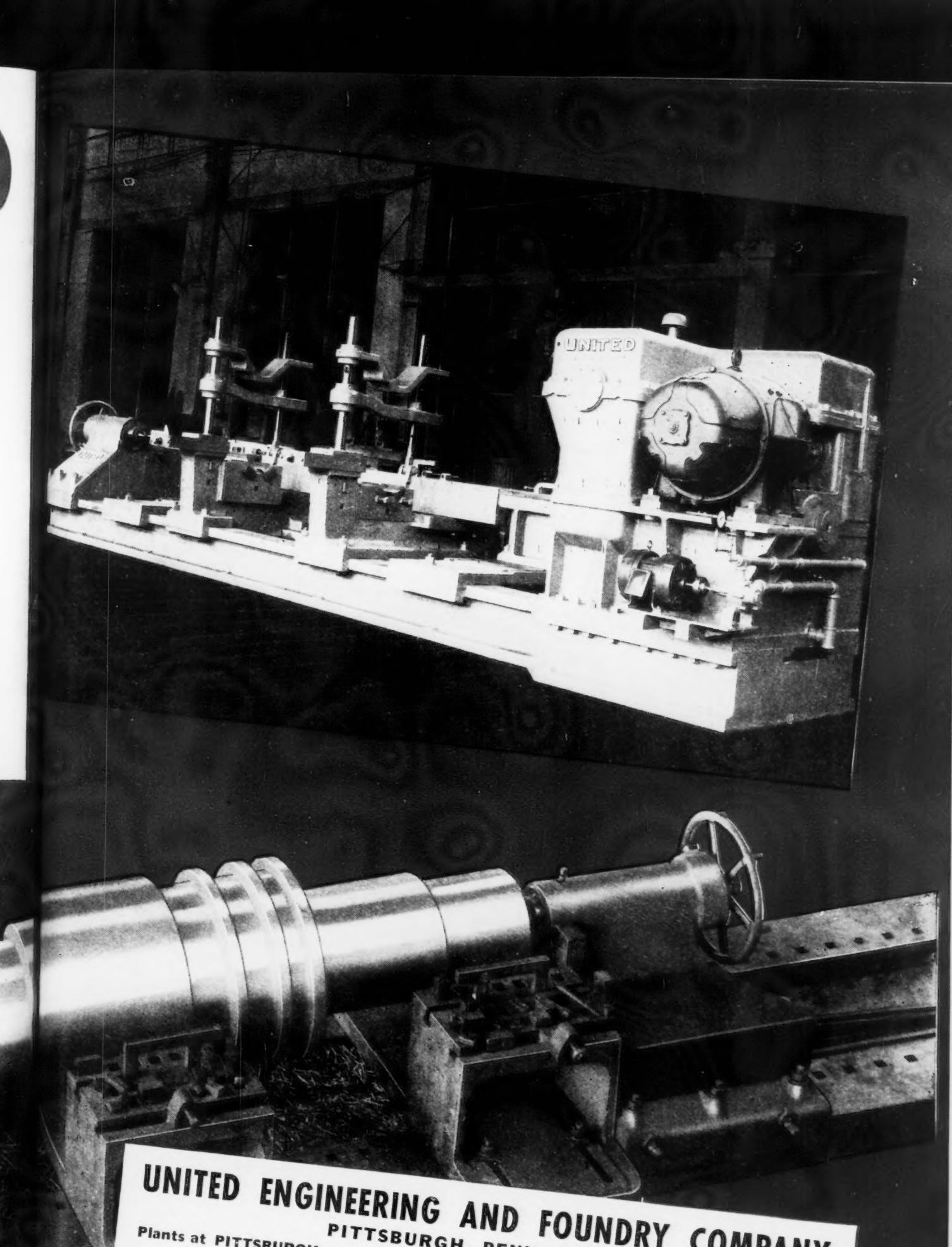
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Consult UNITED engineers for complete technical data.



Showing Comparative Size Between
Conventional and "Cone Worm" Headstock



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH · VANDERGRIFT · NEW CASTLE · YOUNGSTOWN · CANTON

Davy and United Engineering Company, Ltd., Sheffield, England

Dominion Engineering Works, Ltd., Montreal, P. Q. Canada

THE WORLD'S LARGEST DESIGNERS AND MAKERS OF ROLLS AND ROLLING MILL EQUIPMENT





Water . . . enormous quantities of it . . . are used in industrial cooling operations. Water comes into the plant *cool*—goes down the drain *hot*.

But war has caused acute water shortages in many industrial localities. Plant engineers then face a real problem . . . especially where continuous processes require continuous cooling, and lack of water can stop production or cause serious damage.

Solving this problem in many a war plant, G-E evaporative cooling equipment makes as little as five gallons do the work of 100 gallons! With evaporative cooling, water is cooled and used again and again. Comparatively little fresh water is needed.

If water has become a strategic material in your plant, learn how G-E evaporative cooling can help conserve it. And remember, the same

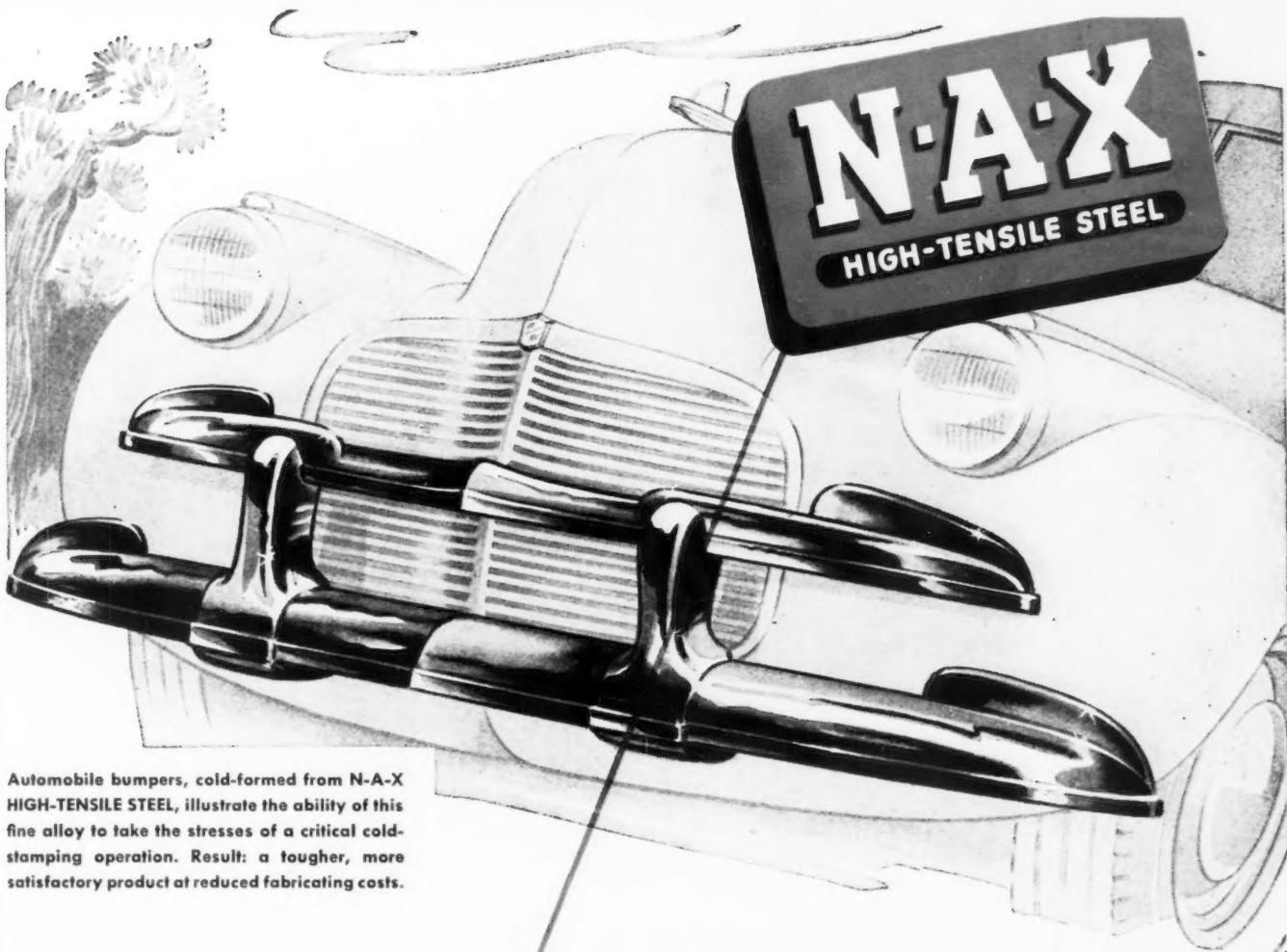
equipment that saves *water* also saves money—by reducing water costs. In fact, in most installations, water savings *alone* are sufficient to pay for the cost of the equipment!

For information write: *General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 4412, Bloomfield, N. J.*

★ BUY WAR BONDS ★

Industrial Cooling by
GENERAL ELECTRIC

Hear the General Electric Radio Programs: The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 p.m., EWT, NBC . . . "THE WORLD TODAY" News, Every Weekday, 6:45 p.m., EWT, CBS



Automobile bumpers, cold-formed from N-A-X HIGH-TENSILE STEEL, illustrate the ability of this fine alloy to take the stresses of a critical cold-stamping operation. Result: a tougher, more satisfactory product at reduced fabricating costs.

THIS HIGH-TENSILE STEEL "TAKES OVER" WHERE DRAWING STRESSES ARE TOUGH

N-A-X HIGH-TENSILE STEEL has stepped into some tough spots in the production of intricate shapes. It has proved to production men that here is a great steel to work with, from the standpoints of both manufacturing operations and finished performance.

To put it in a few words, N-A-X HIGH-TENSILE STEEL has what it takes to make a stronger, tougher product through more efficient production methods. Its exceptional ductility and resistance to impact, inherent in the fine grain structure of a great alloy, often make possible the speed and economy of cold-forming on pieces which must be worked hot when other grades of steels are used. And where critical drawing stresses require hot work, N-A-X HIGH-TENSILE STEEL provides the important advantage of maintaining its high physical properties with

minimum cooling distortion even after it has been subjected to a wide range of temperatures. No subsequent treatment is needed to maintain "as rolled" specifications.

Add to these advantages the high fatigue life and resistance to corrosion and abrasion that qualify N-A-X HIGH-TENSILE STEEL for varied types of applications, and you'll see why this fine-grain, low-alloy steel is a factor in postwar planning. Great Lakes Steel metallurgical service is yours on request: Let's have your problem.

GREAT LAKES STEEL *Corporation*

DETROIT 18, MICHIGAN • SALES OFFICES IN PRINCIPAL CITIES
Division of NATIONAL STEEL CORPORATION. Executive Offices, Pittsburgh, Pa.



**GREAT STEEL
FROM
GREAT LAKES**

N-A-X HIGH-TENSILE STEEL compares favorably with other low-alloy high-tensile steels in yield and tensile strength, with outstanding ductility and notched bar values. In applications where it replaces mild-carbon steels, it serves to reduce weight or increase strength through the utilization of these properties in design. Another property that may interest you is the excellent weldability of N-A-X HIGH-TENSILE

HIGHLIGHTS OF N-A-X ALLOY STEEL

STEEL—whether welded to itself or to other high-tensile or structural steels of welding quality.

N-A-X 9100 SERIES STEELS are produced in carburizing and constructional grades. Except for carbon, they have a chemical analysis that is constant within definite ranges. Together with X-9100 Series steels, containing molybdenum, they provide hardenability ratings to cover a wide variety of requirements, yet give an all-

purpose analysis to yield properties. Molybdenum confers great depth hardenability to extend the usefulness of the N-A-X 9100 Series, which are medium-hardenning steels.

N-A-X ARMORPLATE is an example of the exacting requirements that Great Lakes can meet with this low-alloy series. One of the X-9100 Series steels, containing molybdenum, they provide hardenability ratings to cover a wide variety of requirements, yet give an all-



WILL THESE MACHINE TOOLS MEASURE-UP TO YOUR POST-WAR PRODUCTION?

Exposed to all kinds of weather, stored hit-or-miss in warehouses...that's what happened to many machine tools which didn't have war jobs, when peacetime production lines were hurriedly dismantled three and more years ago. Now, in this "abandoned" equipment lies the nucleus of many a post-war civilian product—perhaps yours.

That's why reconversion-minded manufacturers are initiating systematic rebuilding programs by Simmons to restore "stored-for-the-duration" machine tools to peak efficiency. And they are including even the newer machines in their plants whose productiveness has been impaired by the stress of war work.

For Simmons engineers have developed *Engineered Rebuilding* techniques that not only

restore a worn tool to its maximum efficiency, but often "build-in" new utility beyond the originally designed capacity. Lengthened beds or tables, widened housings, special motors and gear transmissions and other labor-saving devices, for example, to provide more efficient and economical plant operation.

Engineered Rebuilding can play a major part in setting up your new production line. Make it your first reconversion "must." Inquire now how "The Simmons Way" can facilitate your program.

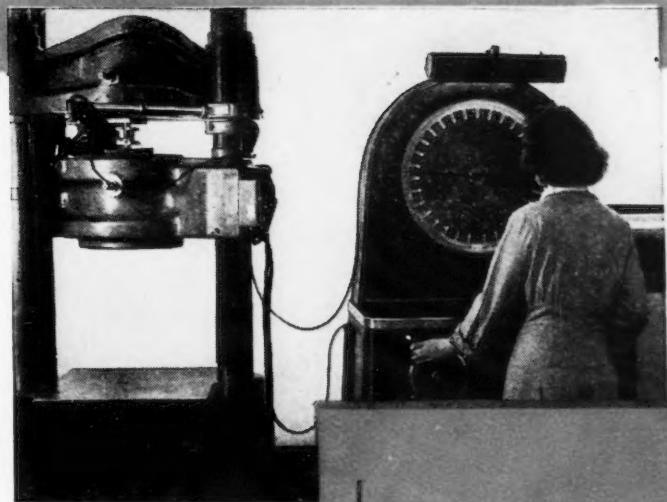
President

SIMMONS MACHINE TOOL CORPORATION
1721 NORTH BROADWAY, ALBANY 1, NEW YORK

SIMMONS Engineered REBUILDING

B&W Maintains Technical Control of Tubing Through Tensile Tests

Strain on specimen subjected to stretching on 300,000-pound tensile testing machine is autographically recorded.

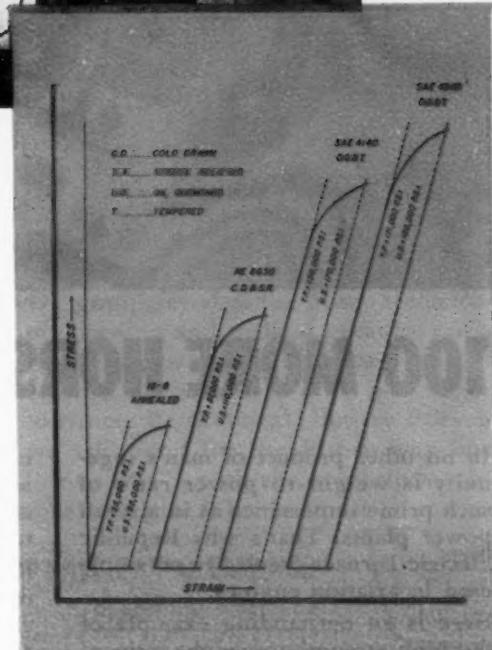


Literally hundreds of tensile tests are made daily in B&W's modern laboratory to make sure that the tubular products furnished by the company conform exactly to customers' specifications of yield strength, elongation and ultimate tensile strength. Results of these tests serve the equally important purpose of checking uniformity of B&W Tubes.

Strain diagrams, in many instances, are autographically recorded in determining yield strength and these reports form a part of the permanent record of each test for future reference.

These extensive tensile tests are but one example of the thorough metallurgical supervision applied to the production of B&W Tubes . . . are one of the reasons why B&W Tubes can be depended upon to have the right physical properties necessary to give lasting dependability and economy in each mechanical application.

The vast fund of experience and technical data accumulated by B&W in making and applying tubing for a wide diversity of mechanical uses is available to all tube users, in selecting the right kind of tubing for any requirement. B&W Tubes cover the complete range from low carbon steel to highly alloyed stainless steels.



Reproduction of a recording of strain curves—showing tensile and yield point values for B&W tubular products under several conditions of heat treatment.

B & W TUBES

SEAMLESS. Complete range of carbon, alloy and stainless steels. Sizes: $\frac{1}{2}$ in. to $8\frac{1}{2}$ in. O.D.

ELECTRIC-RESISTANCE WELDED Carbon steel
grades. Sizes: $\frac{1}{2}$ in. to 4 in. O.D.

THE BABCOCK & WILCOX TUBE CO.

Welded Tube Division Seamless Tube Division
Alliance, Ohio Beaver Falls, Pa.

TA-1306

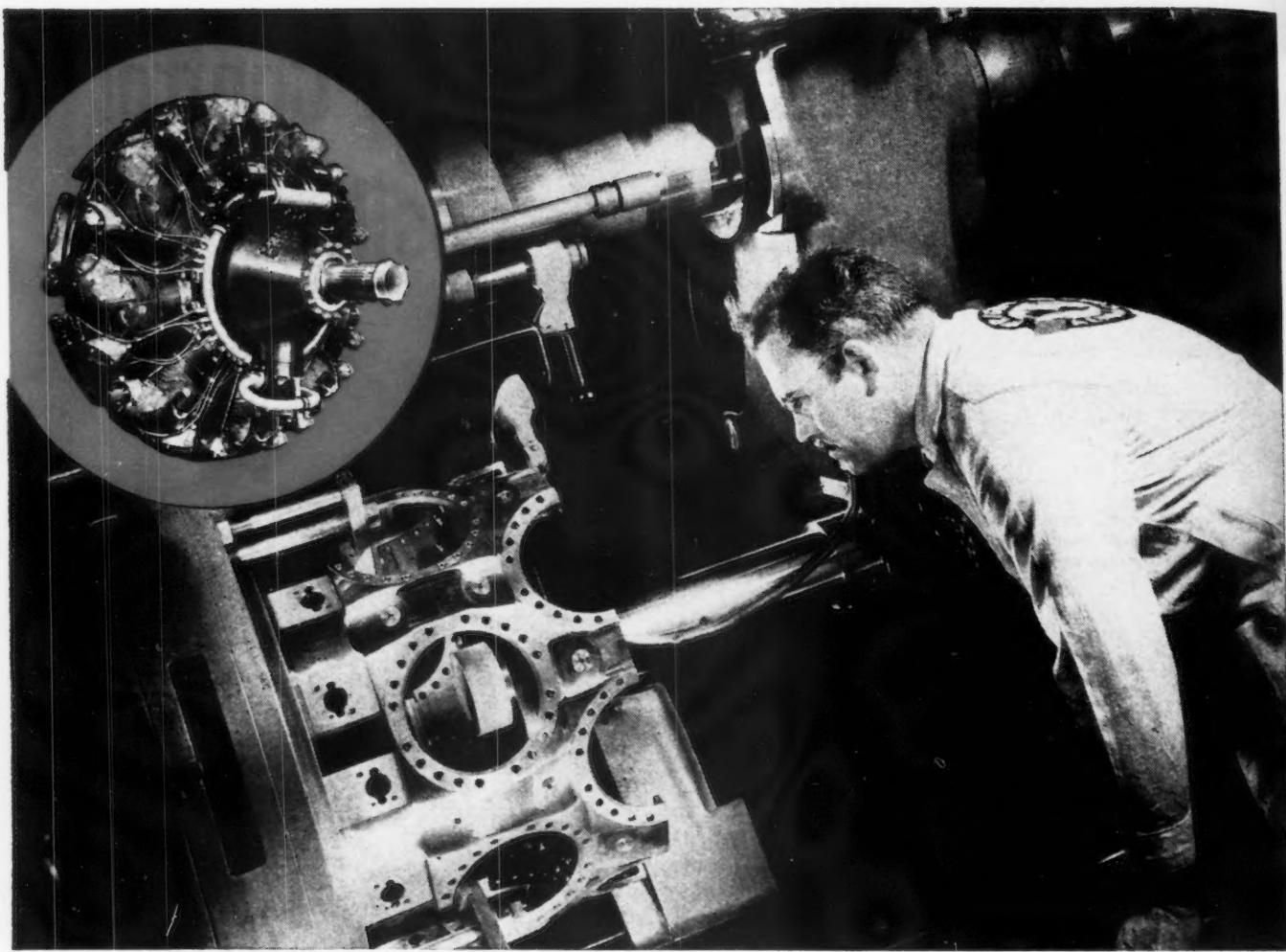


Photo Courtesy Wright Aeronautical Corporation

100 MORE HORSEPOWER—NO MORE WEIGHT

In no other product of man's ingenuity is weight-to-power ratio of such prime importance as in aircraft power plants. That's why Republic Electric Furnace Steels are so amply used in aviation engines.

Here is an outstanding example of the high strength-to-weight ratio of these steels.

When adopted as the material for the crankcase of a famous-named radial engine, Republic Electric Furnace Steels not only permitted an increase of 100 horsepower but *actually reduced the weight*.

There are other reasons, too, for the use of these fine steels.

They are as CLEAN and SOUND as the most expert furnace practice can make them. They are free from hidden imperfections. Thus, they insure against rejection at final inspection and the irrecoverable loss of time and labor expended in producing intricate parts at high production cost. Again for example, the crank-

case illustrated above requires 137 separate operations. Hence, material cost is a very small fraction of the total cost.

Republic Electric Furnace Steels are consistently UNIFORM in physical, chemical, hardenability and performance values. They are homogeneous and free from practice-upsetting variables. They permit manufacturers to employ mass production methods with maximum efficiency.

And these steels enable engineers to predetermine product quality — be-

cause they are "targeted" by the close control possible only in electric furnace melting to hit narrow specifications—with repeated exactness.

A Republic metallurgist is ready to tell you where YOU can use these steels to improve quality, production and PROFITS. When may he call?

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

GENERAL OFFICES • CLEVELAND 1, OHIO

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Bldg., New York 17, N. Y.



REPUBLIC

—Leader in the Production of
ELECTRIC FURNACE STEELS

"QUALITY" steels . . . alloy . . . stainless



• "When our Por-os-way trial wheel arrived, a number of our engineers asked themselves in on the test. We tried Por-os-way on high speed, oil hardened and many other steels. They were goggle-eyed at the heavy feeds Por-os-way took without burning and without great loss of abrasive. They'd never seen *anything* like Por-os-way's cutting action. And the way it cut costs!"

Be hard to convince. Be skeptical. But try Por-os-way . . . that's all we ask. Send for the Por-os-way booklet "Facts About Por-os-way"—with the prescription blank. Order a trial wheel and give it the business!

YOU'VE GOT TO HAVE CHIP CLEARANCE—

The tiny cutting edges of grinding wheels need chip clearance—as do shaper tools—to remove material without interference. The Por-os-way structure provides chip clearance NATURALLY. Long chips prove it! Chip clearance means much less dressing required.

THIS MAKES THE DIFFERENCE—

You can spot the difference between an ordinary wheel (top) and a Por-os-way wheel (bottom) with the naked eye. The extra porosity of Por-os-way is the reason for more than 8 distinct operating advantages.

The Wheel that Costs the Most at First—Costs the Least at Last



Research has established the practicability of using—for my jobs—the same Por-os-way wheel for rough grinding as chosen for precision finishing. By taking advantage of this double duty you may also eliminate the "special" finish wheel and save costly time wasted on wheel changes and extra finishing operations. It's worth trying!

The List of Por-os-way Users Reads Like a Blue Book of American Industry, Included are:

C. Atkins & Company • Bell Aircraft • Edward G. Budd Co. • Buick Motor Division of General Motors • Kinner Motors, Inc. • Studebaker Corporation • Thompson Aircraft Products • Wadell Engineering Company • Westinghouse Electric • Wright Aeronautical

*T. M. Reg. U. S. Pat. Off.
Copyright, 1944
A. P. de Sanno & Son, Inc.

RADIAC[®]

POR-OS-WAY*

A. P. DE SANNO & SON, INC., 434 Wheatland St., Phoenixville, Pa., Since 1893

NEW YORK, PITTSBURGH, CLEVELAND, DETROIT, CHICAGO, LOS ANGELES

Radiac POR-OS-WAY • Radiac PARAFLEX • Radiac Mounted Points and Mounted Wheels
Radiac Internal Grinding Wheels • Radiac Abrasive Cut-Off Machines and Discs

RADIAC*

PRESCRIPTION FITTED AND CUSTOM-COMPOUNDED MOUNTED POINTS, MOUNTED WHEELS AND INTERNAL GRINDING WHEELS END GUESSING, DELAYS AND ERRORS.

Radiac considers every job as a special job. Radiac wheels are actually prescribed for your condition. This "prescription" is custom-compounded and filed. Reorders are made up from the original prescription with great care and accuracy. That's why, with Radiac, you get the right wheel . . . every time! Write for booklet with complete details on Internal Grinding Wheels (booklet #1) and Mounted Points (booklet #2).

RADIAC MOUNTED POINTS & MOUNTED WHEELS

All wheels and points are dressed and finished ready to use (no finishing, by you necessary) • All kiln glaze is removed • All are 100% tested to precision tolerances • Concentricity is guaranteed • Special Bakelite cement secures wheel to mandrels • Radiac Mounted Points and Mounted Wheels are available in tough, regular aluminum oxide (brown) or in special aluminum oxide (white or red bond) for greater friability.

RADIAC INTERNAL GRINDING WHEELS

All wheels are 100% tested to precision tolerances • Every wheel is a product of pioneers in the development of internal grinding wheels • Radiac Internal Grinding Wheels are available in tough, regular aluminum oxide (brown); in special aluminum oxide (white or red bond) or a special exclusive "Blue Glass" friable bond which permits an increase in the ratio of cutting grain to bond.

PIONEERS

in the development of mounted points, mounted wheels, and internal grinding wheels.

Radiac POR-OS-WAY — Radiac PARAFLEX — Radiac Mounted Points and Mounted Wheels — Radiac Internal Grinding Wheels — Radiac Abrasive Cut-Off Machines and Discs.

*T.M. Reg. U.S. Pat. Off.

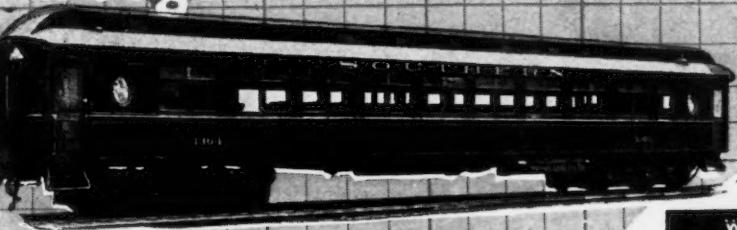
For Fast Stock Removal, Long Life, Cool Cutting—

RADIAC*

A. P. DE SANNO & SON, INC., 434 Wheatland Street, Phoenixville, Penna., Since 1893

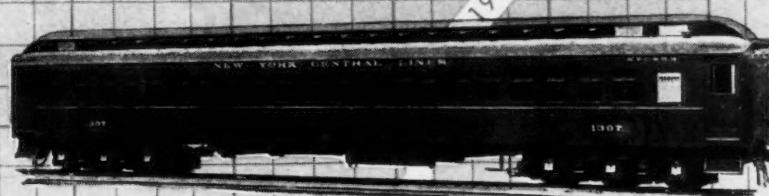
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • LOS ANGELES

The Weight of



WEIGHT OF BODY
1906 - 62,600#
WITHOUT SPECIALTIES

Specialties



WEIGHT OF BODY
1928 - 56,600#
WITHOUT SPECIALTIES

Muse Come Down!



WEIGHT OF BODY
1938 - 33,500#
WITHOUT SPECIALTIES

LIGHTWEIGHT ALUMINUM WILL HELP REVERSE THE UPWARD TREND

Upgrading the luxuries provided passengers has kept car weights at a nearly constant, high level throughout the years. Specialties added to comfort-condition coaches have grown steadily in size and number. Contrariwise, car bodies have been reduced to almost one-half their weight of 1906.

Alcoa Aluminum Alloys have been important contributors to the car shell weight-reduction program. They will do the same thing for specialties.

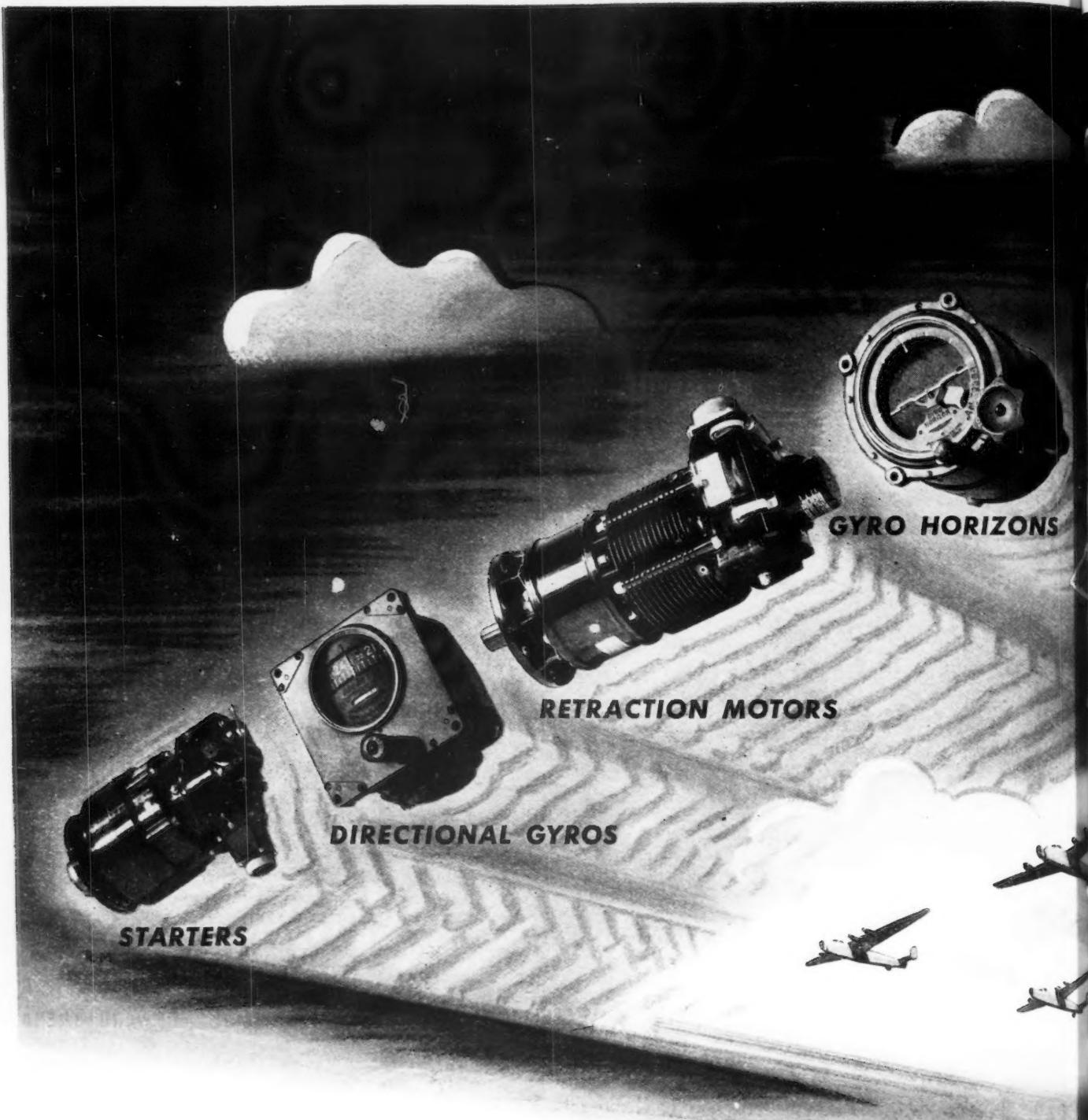
In addition to this weight-saving ability, aluminum alloys offer high strength, sturdiness and dependability. You know

the miracles aluminum has performed in the country's war effort. Aluminum provides high electrical and heat conductivity. It is highly resistant to corrosion. Because of the many attractive, durable finishes possible with aluminum, it lends itself well to the designer who is seeking ways of achieving unusual and interesting effects.

Aluminum is available, with W.P.B. approval, for other-than-war purposes. Alcoa representatives will gladly assist in determining how and where you can use it. Write ALUMINUM COMPANY OF AMERICA, 2185 Gulf Bldg., Pittsburgh 19, Penna.

ALCOA ALUMINUM





"These are a few we can talk about."

Today, the eight Jack & Heintz plants are turning out 36 different war products—in unending streams for the finest aircraft in the world. Our newest assignments are military secrets, but jobs we *can* talk about now are the instruments, auto pilots, generators, starters, motors and bearings that have gone to war by the tens of thousands.

This equipment is used in pursuit planes, bombers, transports, patrol boats, trainers, gliders . . . and even blimps. Its performance has been such that the Jack & Heintz nameplate is now a welcome sign of dependability to the men who gamble their lives on it daily in every corner of the globe.

From the first, Jack & Heintz has led the

GENERATORS

AUTOMATIC PILOTS

BEARINGS



Look about now"

way in reducing weight, boosting output and increasing service life on every job undertaken. Engineering like this has helped keep America's air fleet first in the war . . . it will be equally effective in holding that place in peace.

Watch Jack & Heintz for new things in aircraft!

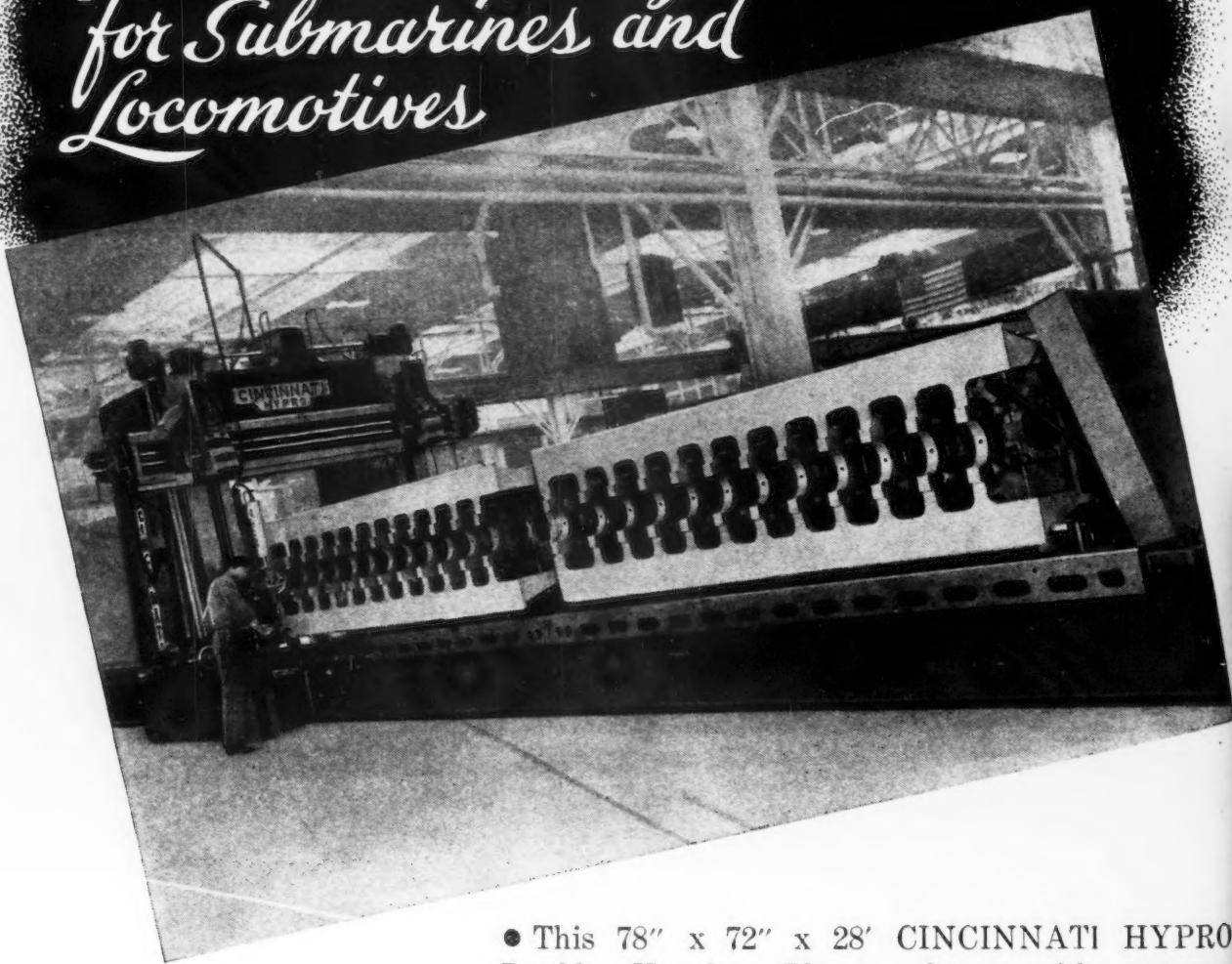

JACK & HEINTZ
Incorporated

Buy More War Bonds and Stamps

Jack & Heintz, Inc., Cleveland, Ohio, manufacturers of Aircraft Engine Starters, Generators, Gyro Pilots, Gyro Flight Instruments, Magneto, Motors.

CINCINNATI HYPRO

Planes Diesel Engine Blocks for Submarines and Locomotives



Write for Bulletin 136-AM containing full information illustrating advantages of Cincinnati Hypro Planers.

- This 78" x 72" x 28' CINCINNATI HYPRO Double Housing Planer planes with extreme accuracy 1000 horsepower Fairbanks-Morse Diesel Engine blocks . . . roughs and finishes main bearing seats, the top and bottom faces of the cylinder block and the main bearing cap fits.

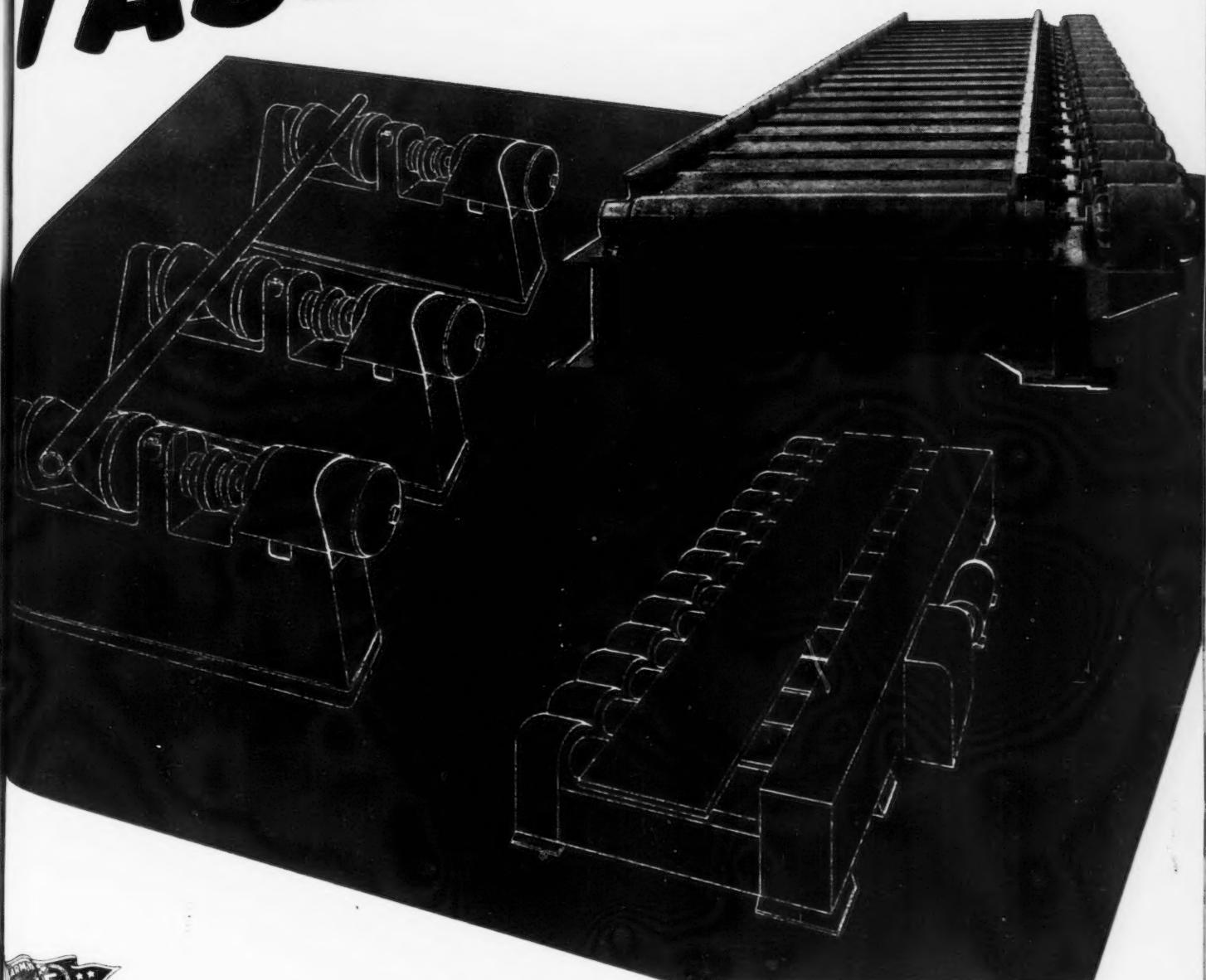
- Massive construction enables this CINCINNATI HYPRO Planer to machine two engine blocks weighing many tons without affecting the planer's rigidity or accuracy. The box type table is amply ribbed to withstand strains of heaviest clamping without distortion.

THE CINCINNATI PLANER COMPANY
Planers...Vertical Boring Mills...Planer Type Millers
CINCINNATI . OHIO . U.S.A.

ANOTHER PRODUCT OF AETNA-STANDARD

MILL TABLES

Aetna-Standard manufactures many sizes and types of Mill Tables, including the following: Furnace Charging, complete with pusher; Furnace Delivery; Structural Tilting and Trailing; Bar Mill and Tube Mill Conveyor Tables.



**THE AETNA-STANDARD
ENGINEERING COMPANY
YOUNGSTOWN, OHIO**



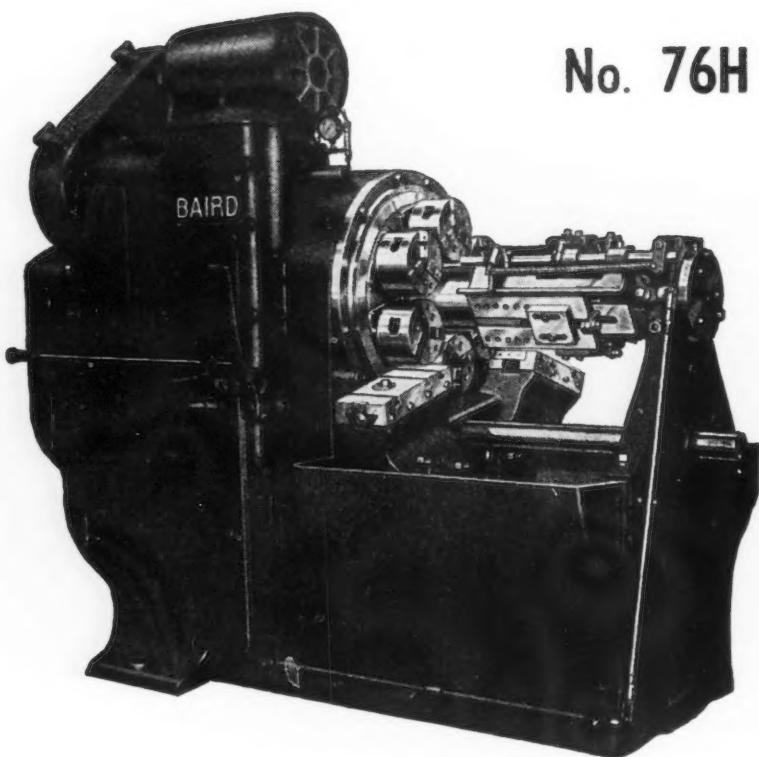
DESIGNERS AND BUILDERS
to the Steel, Non-Ferrous
and Chemical Industries.

ASSOCIATED COMPANIES:
HEAD, WRIGHTSON & COMPANY, LIMITED, THORNABY-ON-TEES, ENGLAND
JOHN INGLIS COMPANY, LIMITED, TORONTO, ONTARIO, CANADA

Tables are equipped with anti-friction bearings, fully enclosed gear drives, centralized grease system.

HIGH PRODUCTION MACHINES FOR WAR OR POSTWAR REQUIREMENTS

No. 76H BAIRD CHUCKER



This pictures the BAIRD 7" Six Spindle Horizontal Automatic Lathe which has become outstanding because of its fine degree of accuracy and its exclusive features as

INDEPENDENT TOOL SLIDES. The longitudinal tool slides may have different strokes adding flexibility for varied tooling. Cross slides also are independent. All tool slides have micrometer adjustment.

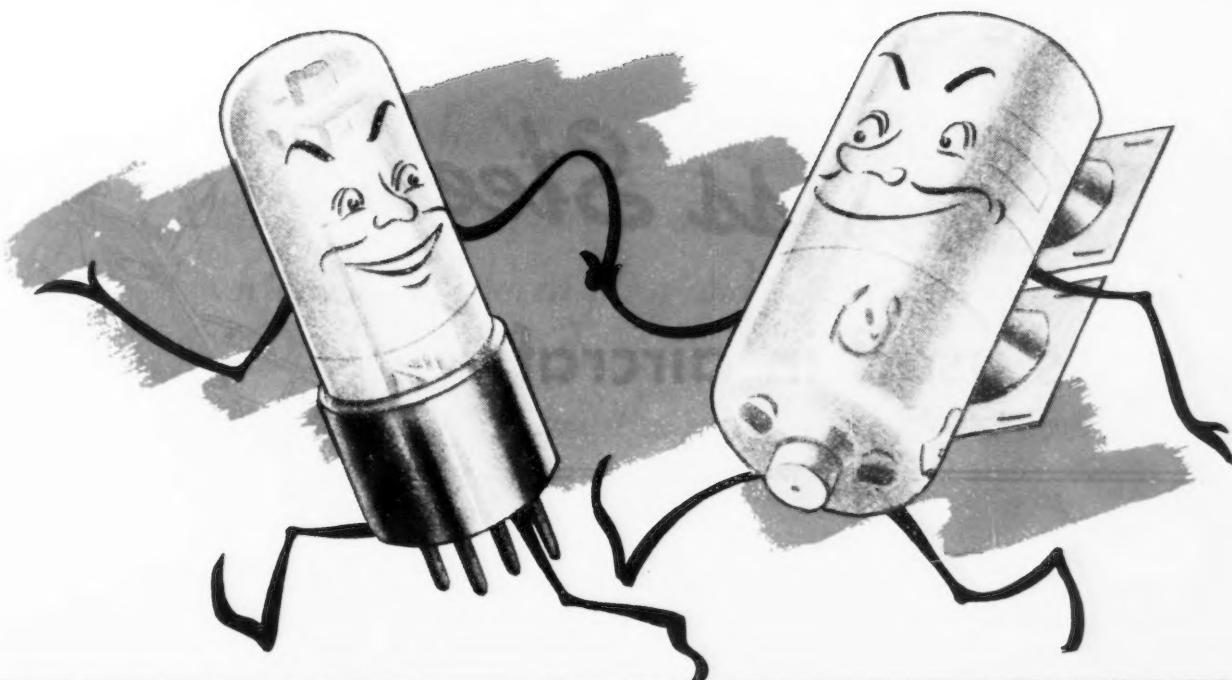
DIFFERENT SPEEDS AT SPINDLES. Ability to choose a speed for the spindle at each work station to suit the operation to be performed at that station permits of best product in least time.

AUTOMATIC CHUCKING. Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.

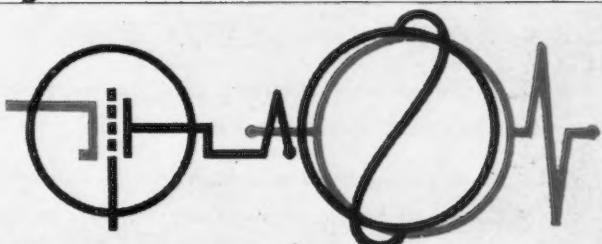
ATTACHMENTS. Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.

"Ask BAIRD About It"

THE BAIRD MACHINE COMPANY, STRATFORD 9, CONN.



*What will this
pair do next?*



ELECTRONICS

AMPLIDYNES

GUN turrets, ship steering mechanisms, paper-machine drives, steel-mill flying shears—these are examples of where the partnership of electronic tubes and G-E amplidyne is already doing several important control jobs.

To picture the possibilities *ahead*, consider how this unusual partnership works:

First, the milliwatt output of a phototube, selsyn, resistor, tachometer, or other sensitive measuring device is amplified electronically to about one watt. Thus, your original signal may be initiated by a light, color, or temperature; by motion; or by changes in power or speed.

Second, this one-watt current gets another powerful boost (is multiplied 10,000 times or more) from the G-E amplidyne, which thus furnishes the kilowatts required to drive or control industrial machines. Because of the extremely fast and accurate response of both electronic tube and amplidyne, the slightest change in the

original milliwatt signal causes a corresponding, precisely proportioned change in the amplidyne's kilowatt output.

This means that machine tools, continuous processes, materials handling—to say nothing of countless steering or positioning operations—can be made more automatic and more precise, and with fewer parts, than was ever before thought possible.

To help you use the amplidyne in harnessing the magic of electronics to industrial needs, we've prepared a booklet which explains how the amplidyne works, and shows where it has been—and can be—applied. Ask for Bulletin GEA-4186. *General Electric Company, Schenectady 5, N. Y.*

**Buy all the Bonds you can
and keep all you buy**

GENERAL ELECTRIC

AMPLIDYNES

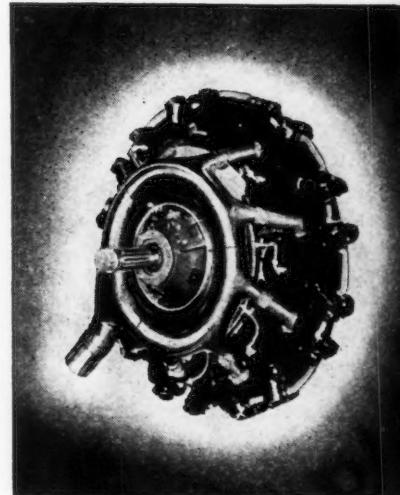
Here are 3 of the Reasons Why *Stainless Steel* is used in aircraft



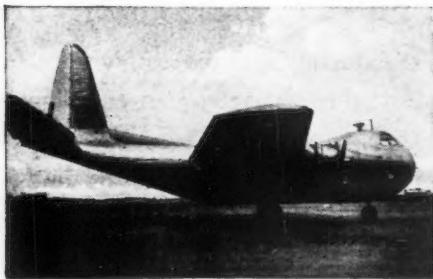
1. The high strength-weight ratio of stainless steel helps cut dead weight to a minimum.
2. Even at extremely low temperatures, stainless steel retains shock resistance, strength, and toughness.
3. Stainless steel is strong and corrosion-resistant even where high temperatures are encountered.

These properties—plus high fatigue strength, low maintenance, and ease of fabrication—make stainless steel valuable for structural parts, for accessories, and in engines. The booklet, "Stainless Steel in Aircraft," gives more detailed information. Write for a copy.

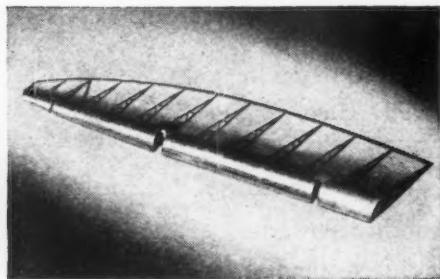
Although we do not make steel of any kind, we do produce the ferrochromium that makes steel stainless. In many years of experience, our metallurgical engineers have accumulated much information on the various types of stainless steel and their uses, available to you upon request.



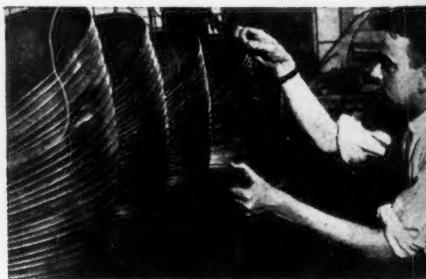
Because stainless steel containing columbium retains resistance to heat and corrosion, exhaust systems of relatively thin-gage metal give long service.



Stainless steel helps make cargo planes lighter, safer, and stronger, and prolongs their usefulness.



Lightweight ailerons and other sections that are strong, durable, and safe can be fabricated from stainless steel.



The extra strength, plus the corrosion resistance of stainless steel, makes end sections of fuel tanks dependable.

BUY UNITED STATES WAR BONDS AND STAMPS

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street  New York 17, N. Y.

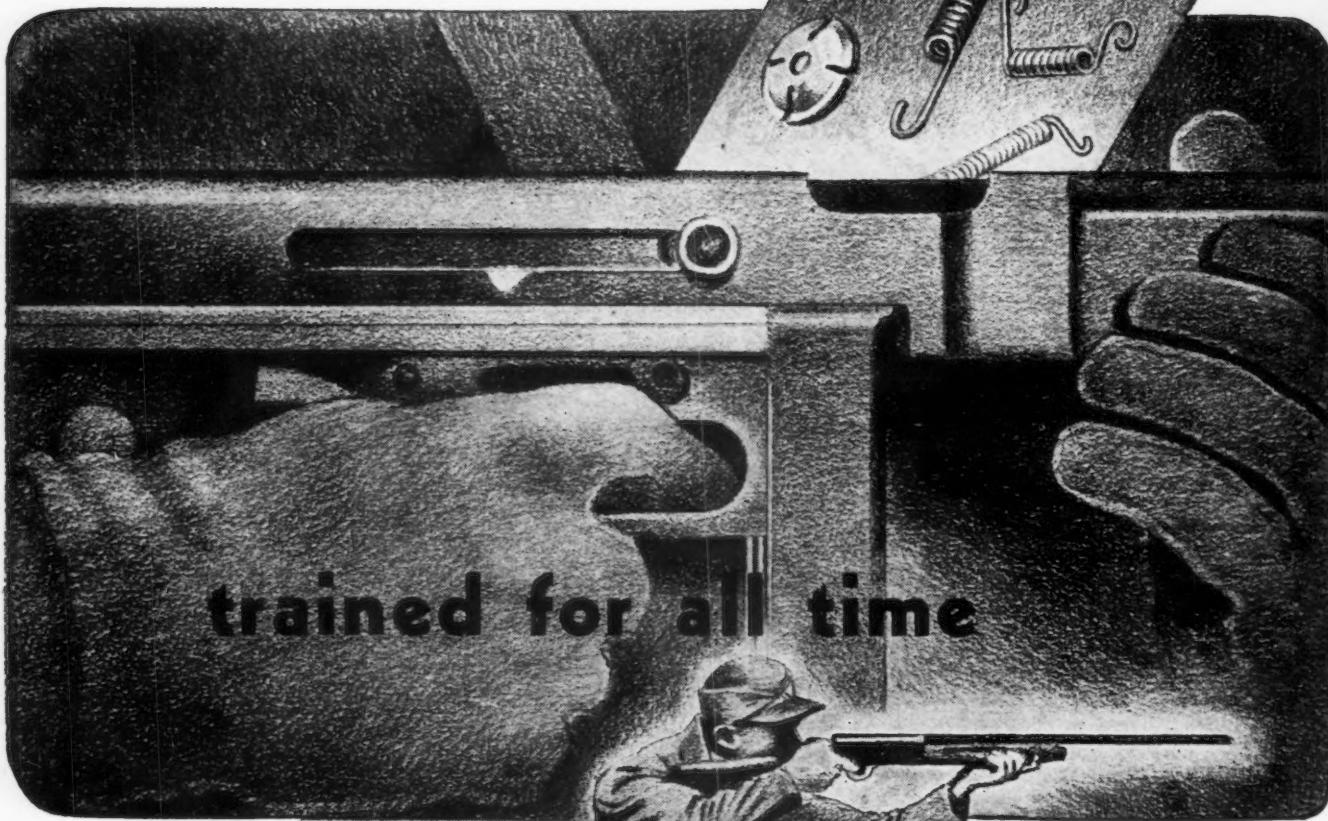
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

To Wish Sincerely is to Pray
To take our proper place in a land at peace,
A world where children play and Men may work
Divorced from Fear,
Where each may know the joy of a task well done
And be rewarded for his share,
Such is our Wish

GISHOLT MACHINE COMPANY
MADISON, WISCONSIN

Trigger Fingers . . .



trained for all time

Fighting for their country, millions of men from every walk of life are learning the value of good mechanisms . . . and the springs that help to make them work. Their trained hands will be quick to judge the worth of the products of the future. Their influence will affect mechanical developments in many fields. For those men who will improve, invent, pioneer the products of a country again at peace, the Wallace Barnes Company offers the resources of an organization trained to design and produce good springs in their infinite variety.

CONSERVE METAL — DESIGN WISELY

1918 —
THEN



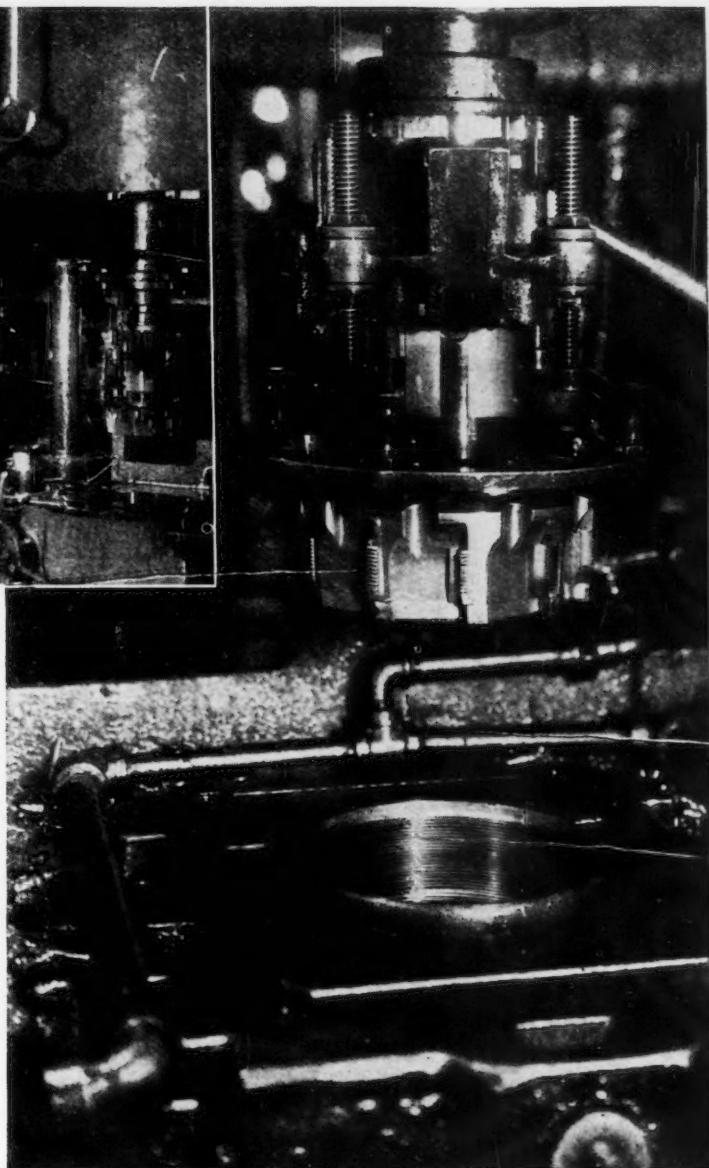
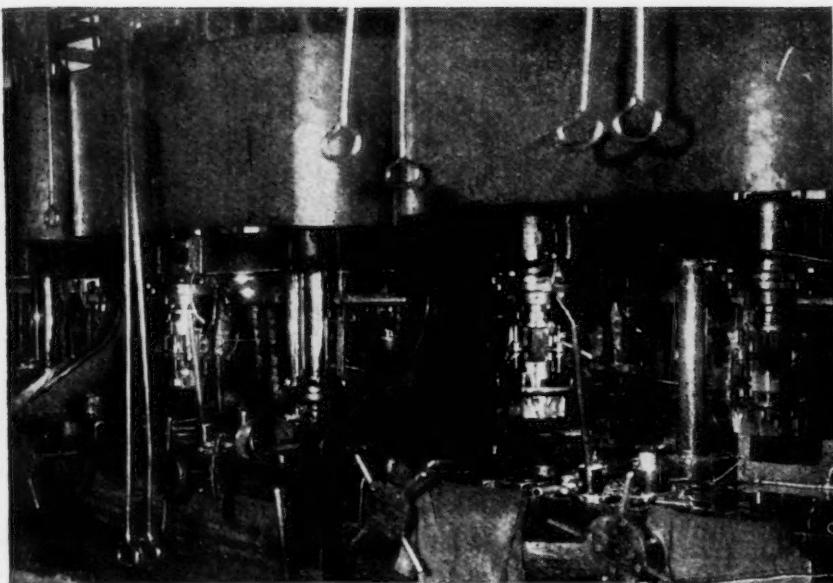
Barnes-made Springs

ENGINEERED PEP AND POWER

WALLACE BARNES COMPANY

DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT, U. S. A.

LANDIS Receding Chaser Collapsible Taps Assure Accurately Tapered Threads



Manufacturers of oil well tubular products employ Landis Receding Chaser Collapsible Taps almost exclusively for producing their internal threads. The sturdy, rigid construction, plus the receding chaser feature which withdraws the chasers as the tap advances into the work, and the positive ratchet size adjustments of the LANDIS Receding Chaser Tap, assure tapered threads of unusually fine accuracy. Threads are produced well within A.P.I. tolerance specifications.

Write for descriptive literature covering
Landis Receding Chaser Taps.

LANDIS MACHINE COMPANY
WAYNESBORO • PENNA • U.S.A.

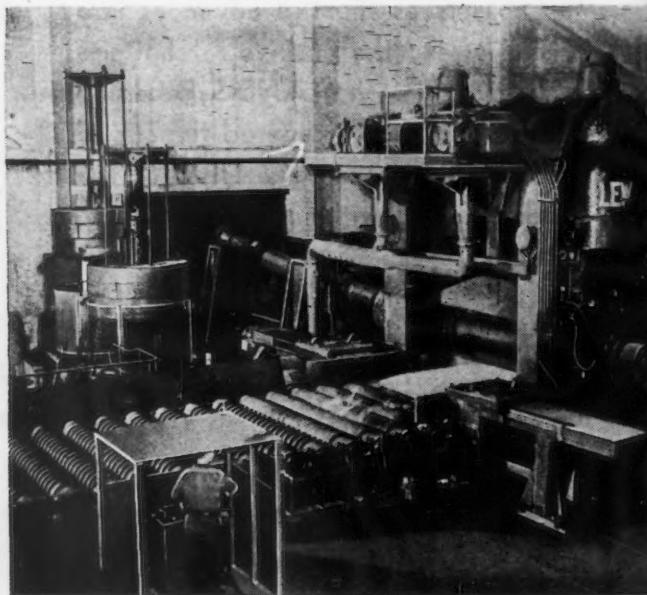
THREAD CUTTING MACHINES • DIE HEADS • COLLAPSIBLE TAPS • THREAD GRINDERS

"DE-PRESSA! VEEM!"



Quick! They're coming! . . . and across 300 miles of mountain trails by mule team comes the equipment for Brazil's first rolling mill! That was back in 1885, when one Jean-Antoine de Monlevade authorized the Lewis Foundry & Machine Co., Ltd., of Pittsburgh, U.S.A., to furnish him with machinery which could produce one ton of iron per day. From this primitive beginning in the wilderness the great Companhia Siderurgica Belgo-Mineria has developed.

Photos at left show what remains of the original mill . . . Below is one of North America's latest rolling mills —built by Lewis, who are happy to acknowledge their long business relationship with Brazil.



LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX COMPANY, PITTSBURGH, PA.

Manufacturers of
Rolls and Rolling
Mill Machinery for
the Ferrous
and Non-Ferrous
Industries



THE **RIGHT** COMBINATION FOR TOPS IN EFFICIENCY



THE RIGHT COMBINATION offers an immediate answer to highest efficiency and low costs in the movement of materials.

The TRANSPORTER for horizontal movement of many more tons of material per load than by conventional methods, from receiving, to process, to storage, to shipping . . . and the "AUTOMATIC" Tiering Fork Truck for stacking of pallet loads, give you a modern handling system to make possible numerous daily and valuable benefits.

You lower handling costs — you do each job speedily to effect valuable time savings — you inject cost savings all along the production line — you get dependable insurance against breakage — you add safety to production — you conserve much needed floor space through high, orderly stacks which are always easily accessible.

**NO STRAINING
...TUGGING...PULLING
Nor PUSHING
with the TRANSPORTER**

POSITIVE MECHANICAL BRAKE • CONTROLS IN STEERING HANDLE • FORWARD AND REVERSE SPEEDS • FRONT WHEEL POWER DRIVE • SHOCKLESS HYDRAULIC PLATFORM LIFT WITH EASY FOOT CONTROL • "DEAD-MAN" CONTROL

USE THE COUPON

AUTOMATIC TRANSPORTATION CO.
75 West 87th Street, Chicago 20, Illinois

Gentlemen: Please send details on the employment of this truck combination for materials handling.

Name _____

Company _____

Address _____

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AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.

75 W. 87th STREET

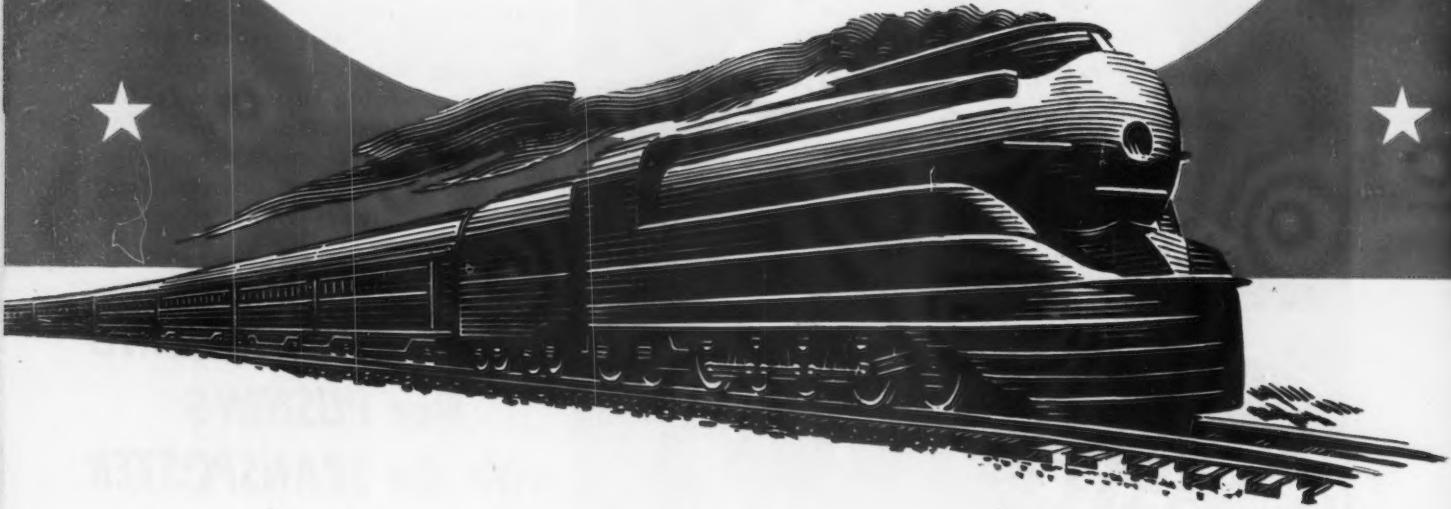
CHICAGO 20, ILLINOIS

MANUFACTURERS FOR OVER 35 YEARS Electric Propelled INDUSTRIAL LIFT TRUCKS

THE NEW SELLERS

RAIL DRILLING MACHINE

*A Postwar Development
... Ready Today*



HERE is a completely new machine built to cope with the demands of modern rail mill practice and to overcome the disadvantages of earlier designs.

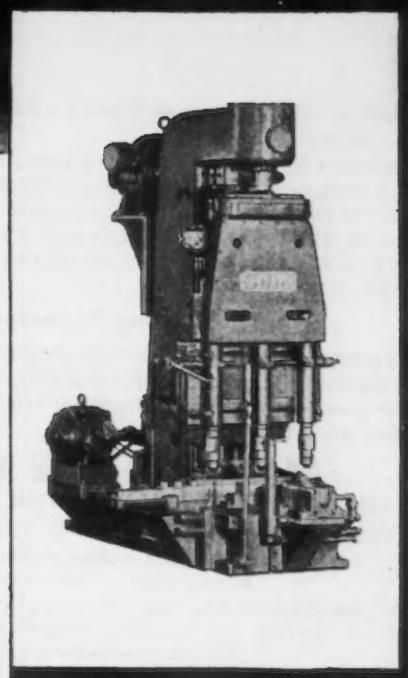
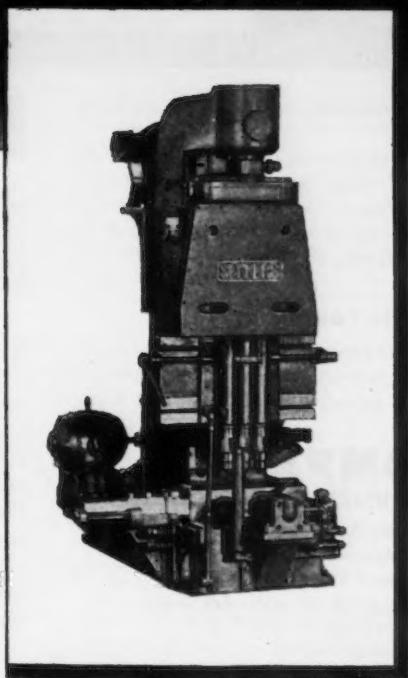
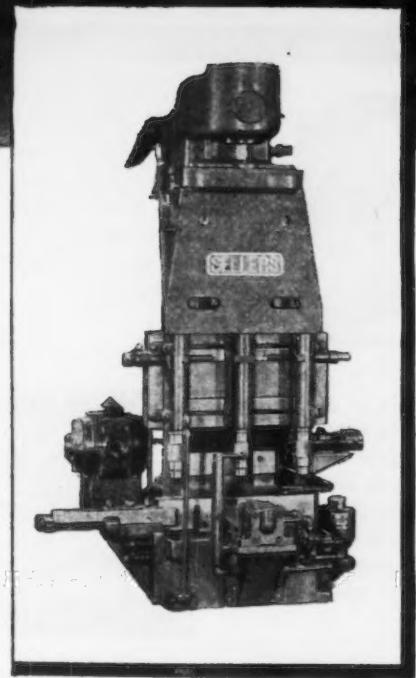
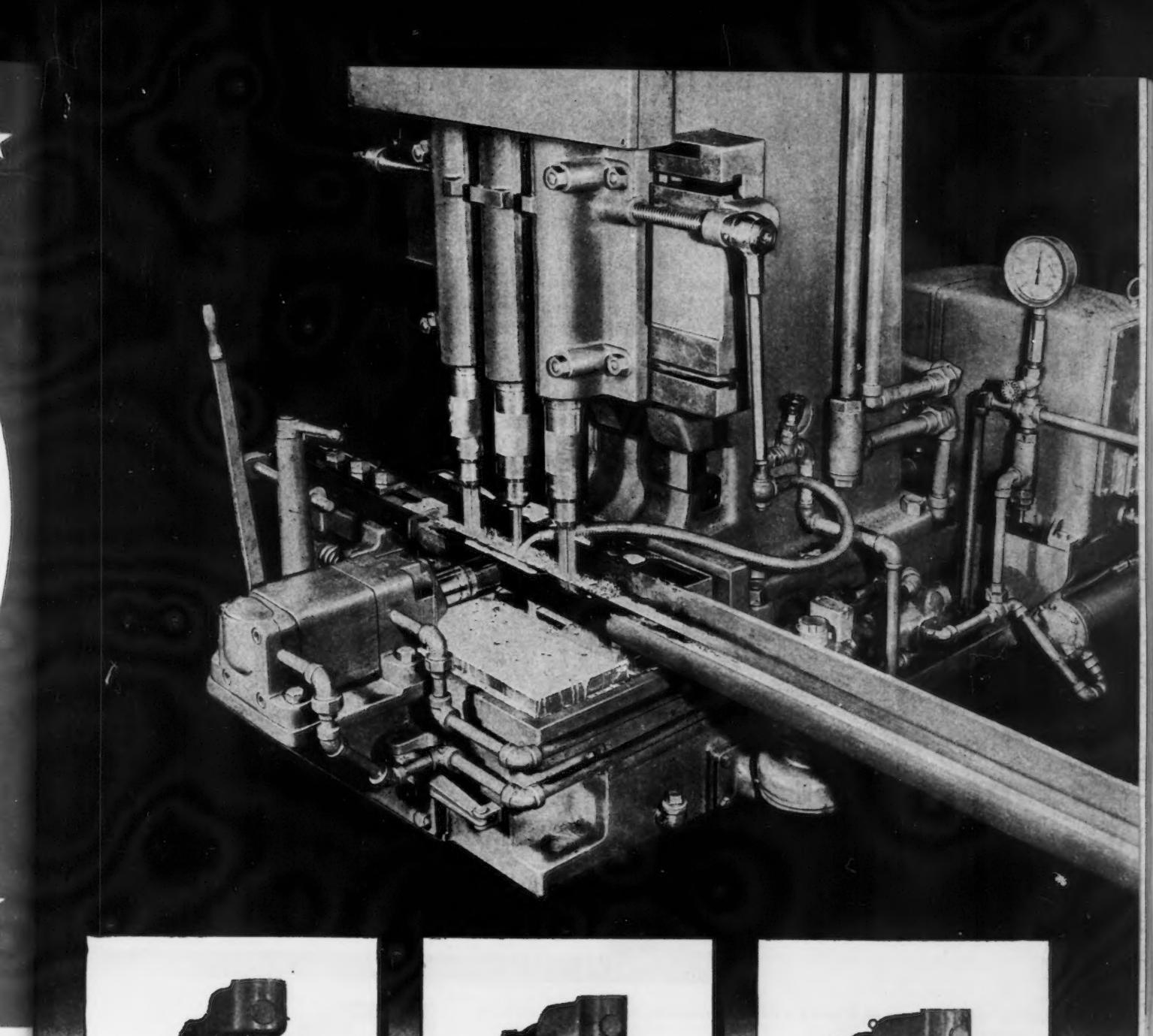
The service expected from a rail drill is hard and the treatment accorded it severe; consequently, Sellers construction is simple, the parts strong and the spindles supported as close as possible to the work. Its gearing is unusually strong and mounted in oil-type casing on the top of the main housing. All gears are high grade forgings and run in oil. All shafts are mounted in anti-friction bearings . . . This type of drive requires no more attention than the rear axle of an automobile.

The saddle carrying the tool steel drill spindles is counter-balanced and provided with fluid power feed and power traverse . . . All movements are under instant control. The rail being drilled is clamped or unclamped hydraulically. The vertical stroke is $6\frac{1}{2}$ " . . . Saddle can be set to drill any thickness of rail, either automatically or hand operated . . . Minimum distance between spindles is $3\frac{1}{2}$ ". Maximum, 12" . . . Spindle speeds are variable, ranging from 45 to 180 RPM.

For complete technical data and delivery dates, write:

WM. SELLERS & CO.
1600 Hamilton St. Philadelphia, Penna.

Machine Also is Designed and Built to Drill Elongated Holes When Required



SELLERS

**PRECISION TOOLS
SINCE 1848**

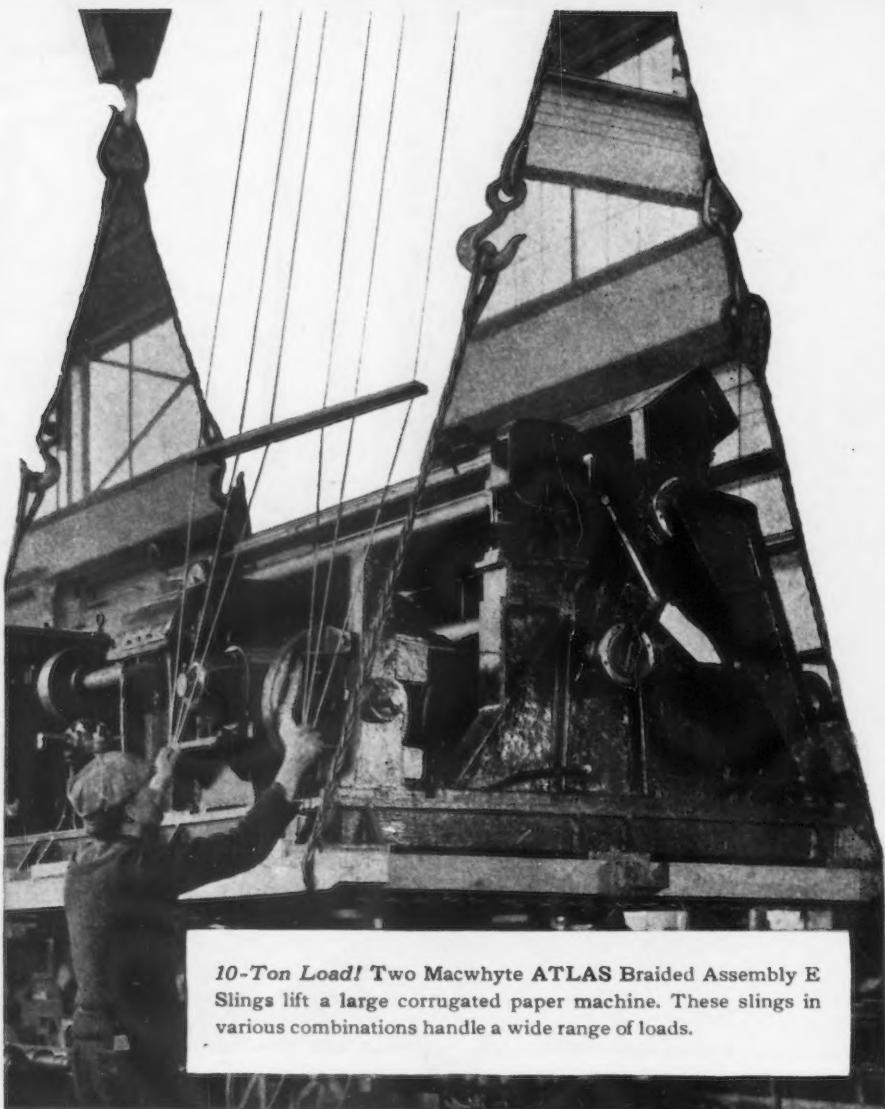
There's a

MACWHYTE

WIRE ROPE

SLING

to meet your
requirements!



10-Ton Load! Two Macwhyte ATLAS Braided Assembly E Slings lift a large corrugated paper machine. These slings in various combinations handle a wide range of loads.

No matter what your load, there's a Macwhyte sling to handle it quickly, easily, safely!

For years Macwhyte Sling Engineers have been studying handling problems—designing Macwhyte Slings—for special jobs, many of which are very similar to yours. Today you have available at Macwhyte, a wide selection of patented wire rope sling designs and types, with reliable information as to strengths and safe loads, to assist you in stepping up safety and improving your plant operations.

Broad Sling Experience is Yours...

You receive prompt, practical cooperation. Macwhyte Sling Engineers study your handling needs and help you plan the design best for your requirements.

A request on your company letterhead will bring you a Macwhyte Sling Catalog and literature.

MACWHYTE COMPANY
2911 FOURTEENTH AVENUE, KENOSHA, WISCONSIN

Manufacturers of the CORRECT wire rope for your equipment

Left-& Right Lay Braided Slings • Aircraft Tie-Rods
Aircraft Cable • "Safe-Lock" Swaged Terminals

*Mill Depots: New York • Pittsburgh • Chicago • Ft. Worth • Portland
Seattle • San Francisco • Distributors throughout the U.S.A.*

Manufactured under U.S. and Foreign Patents



No Load Is Too Large! Two Macwhyte ATLAS Wire Rope Slings move a mammoth roll in a steel mill. Quick handling of rolls speeds production.



106 Tons of Steam Engine! Two Macwhyte ATLAS Type No. 1 Braided Slings in an inverted basket hitch lifted this giant marine engine easily and safely. Macwhyte Slings can do the same with your loads.

MACWHYTE SLINGS FOR INDUSTRY
"Lifting safety to new heights"

Macwhyte Wire Rope Slings are made to meet the capacity of any crane built.

★ Hold what you have — buy more War Bonds! ★



Member National
Safety Council

Information Free

(1) Vacuum Cleaning:

New general bulletin on stationary vacuum cleaning gives an outline of the various components of the equipment, new uses and valuable application data with a complete list of special data on swimming pool, boiler and dry mop cleaning and vacuum tools and hose. *Spencer Turbine Co.*

(2) Rivets:

12-page illustrated manual on Hi-Shear rivets, a recent development by North American Aviation, Inc., features pertinent facts, greater advantages, gun and squeezer methods of installation, progressive forming, correct length and simplicity of removal. *Pheoll Mfg. Co.*

(3) Taps:

Uniquely compiled handbook contains invaluable information on taps. It is divided into seven sections, which are listed as follows: Basic tap terms; tap selection for desired class of fit; catalog of standard taps; special taps; threading tools; thread grinding; ground thread tap limits; tap blank dimensions and appendix. *Sossner Tap & Tool Corp.*

(4) Resisting Castings:

Folder gives six pages of Stermet typical applications. It also contains casting charts on grades and applications for temperatures 1000 deg. F. to 2250 deg. F. and on physical properties of castings. Several pages are devoted to allowable stress design and a page on corrosion resistance. *Sterling-Alloys, Inc.*

(5) Testing Machines:

For commercial or control testing and research Riehle has developed and constructed precision testing equipment to satisfy demands of producers. This folder illustrates and describes several of the company's precision hydraulic testing machines plus a full range of precision instruments. *Riehle Testing Machines Division of American Machine & Metals, Inc.*

(6) Alloy Castings:

Heat and corrosion-resistant alloy castings made by the company are discussed in this 16-page booklet. It also describes in detail the most widely used alloys, includes numerous illustrations of castings both statically and centrifugally made, along with design stresses and average mechanical and physical property tables. *Michigan Products Corp.*

(7) Heat Treating Furnaces:

39 pages of illustrations and engineering data in this book will give important information on the Hevi-Duty line of electric heat treating furnaces and furnace application. Over 20 types of furnaces are listed and a section of the book is devoted to atmosphere producing equipment. *Hevi-Duty Electric Co.*

naces are listed and a section of the book is devoted to atmosphere producing equipment. *Hevi-Duty Electric Co.*

(8) Collet Chucking Fixture:

This fixture has a practically universal application in the holding and indexing of work on milling machines, drill presses, grinders and other machine tools. Two types are available for two purposes: (1) for holding and indexing and (2) for holding only. Both are completely described in this circular. *Zagar Tool, Inc.*

(9) Roof Ventilators:

Design and structural features for the free-flow gravity ventilator, standard gravity ventilator, free-flow fan ventilator and the standard fan ventilator, together with a picture of each and charts giving performance and dimensional data are given in this folder. Information is also contained on the five general types of ventilator dampers and controls. *Burt Mfg. Co.*

(10) Precision Gages:

New gage catalog features three exclusive new gage developments, which are (1) the limitrol gage which performs six visual inspection operations in one, (2) carboly gages with the Woodworth exclusive segmented shank and (3) gages of cast stellite alloy. Equally newsworthy are the lists of specifications under H-28 and H-25 standards. *N. A. Woodworth Co.*

(11) Broaching:

The Zagar hydraulic broaching machine, which is both speedy and accurate, will take care of up to 80 per cent of all your parts production. The machine is small, compact and self-contained. There are very few wearing parts to cause ultimate maintenance, therefore, low cost operation results. Other advantages, features and specifications are given in the folder. *Zagar Tool, Inc.*

(12) Hydraulic Devices:

Folder exhibits some of the company's hydraulic devices, which are engineered and developed for specific applications. Some of these custom-built hydraulic presses have broad applications and a duplicate or modified design to meet your requirements. Others, limited to unusual operations, may merely suggest possibilities in application. *Lyon-Raymond Corp.*

(13) Vacuum Equipment:

Company folder describes the widespread application of their equipment in industry, as well as illustrating a number of their units. The folder discusses the advantages of their products for plant cleaning, the use of vacuum equipment to solve unusual production problems, covering removing, conveying or reclaiming

of material, together with typical examples. *Vacuum Cleaner Mfg. Co.*

(14) Electrodes:

A new informative book on how to select the proper electrodes for welding stainless steels, also includes much helpful information on welding procedures and recommendations. It covers such subjects as carbide precipitation, distortion or warping, effect of heat on the base metal, butt joint design and many other conditions encountered in welding stainless steels. *Page Steel & Wire Division, American Chain & Cable Co., Inc.*

(15) Handling Materials:

How practically any manufacturer can achieve symmetrical standardization in handling materials is described fully in a new 20-page book. Almost every page contains illustrations and ideas for organizing plant interiors, for modern mass production, and the systematic movement of products or parts through the plant. *Factory Service Co.*

(16) Plastics:

Folder features economical, rapid and accurate production of plastic parts for your use, which can be attained through the diversified fabricating facilities and skill available in the McInerney plant. Other benefits received are prompt service, extensive facilities, flexibility of operation and aid in adapting. Also contained in the folder are charts which are genuinely helpful because they identify the suitability of various plastic materials for different mechanical, electrical and chemical applications. *McInerney Plastics Co.*

(17) Regulator:

The Bloom steam-oil pressure ratio regulator provides an automatic means for correctly proportioning the steam pressure to a group of steam atomizing oil burners in proportion to oil pressure. Bulletin gives a complete description of the regulator as well as specifications and operating diagrams. *Bloom Engineering Co.*

(18) Welding Electrodes:

Bulletin, which gives a complete description of each electrode in the Allis-Chalmers line, also includes separate charts on physical properties of weld metal for each electrode as well as on recommended current values. The electrodes are both a-c and d-c types and are easily identified by official AWS classification numbers. *Allis-Chalmers Mfg. Co.*

(19) Lubricator:

The improved constant level general purpose lubricator, style B (a companion to style J), prevents oil waste, insures automatic lubrication as needed at low

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

12/28/44

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INFORMATION FREE (Continued)

cost and offers a reliable automatically controlled, visible oiling method for most types of bearings. It is used on machine tools, milking machines, electric motors, etc. Leaflet gives all necessary information. *Oil-Rite Corp.*

(20) Cutting Fluids:

60-page handbook contains extensive data on steels, machinability, hardness, tools, speeds and feeds, and allied subjects, as well as on the selection and use of cutting and grinding fluids. Typical of the articles are Metal-Cutting Mechanism, Factors in the Selection of Cutting Fluids and The Tool Edge is Important. *D. A. Stuart Oil Co., Ltd.*

(21) Storage Tank:

While the information contained in this bulletin pertains principally to storage tanks for the petroleum industry, the notes on specifications and construction, as well as most of the individual designs may, with certain modifications, be applied to the storage of other products. Booklet contains the storage and protection of volatile products, data on evaporation losses, specifications and other important information. *Graver Tank & Mfg. Co., Inc.*

(22) Gears:

Users and buyers of all types of gears will find the 64-page catalog a valuable compendium of gear information. Not only does it describe and list some of the representative gears the company manufactures, but technical information for ordering gears correctly, symbols used in designating gear parts, formulae for computing the horsepower of various gears and many other handy calculations. *Illinois Gear & Machine Co.*

(23) Speed Reducers:

Catalog gives general description and general and special design features of the spiral-bevel speed reducers. It contains the procedure for selecting unit, table of load characteristics, table of service factors, 15 pages of horsepower ratings, up and down thrust capacity, 19 pages of dimensions and typical installations. *Philadelphia Gear Works, Inc.*

(24) Fountains:

Booklet presents the entire new line of Bradley washfountains, multi-stall showers and drinking fountains. Its contents list: Advantages, materials, hand and foot-controlled fountains, multi-shower description, soap dispensers, washroom planning, typical specifications and many others. *Bradley Washfountain Co.*

(25) Calculator:

A combination steel plate weight calculator and steel plate size selector has been developed by this company for use by engineers and users of steel plate or equipment made of steel plate. The device is unique because of the wide range of gages, widths and lengths of steel plate for which weights can be calculated on it. *Lukens Steel Co.*

(26) Fork Trucks:

How fork trucks are revolutionizing the evacuation of wounded men, how they are performing tasks essential to modern shipment of goods by air, how

they are saving uncalculable manhours in many industries; these and many other applications of this versatile, up-to-the-minute method are dramatically illustrated in a new issue of the Clark Pictorial. *Clark Tractor Division.*

(27) Company File:

Twenty-five 8 in. by 10 in. photographs are representative photographs of installations of Bellows equipment in plants all over the country. Each photograph has in itself an interesting story of how the company's tool engineers have solved difficult production problems. The reverse side contains the complete story of each application together with the cost of Bellows equipment used. *Bellows Co.*

(28) Castings Cleaning:

Informative 12-page digest describes various cleaning techniques and materials for the surface preparation of aluminum, zinc, magnesium, brass, bronze, copper, lead or tin base die castings prior to the application of organic chemical or electro-plated finishes. *Oakite Products, Inc.*

(29) Clamps and Fittings:

8-page catalog, P-1 on clamps and fittings contains complete technical data on entire line so aid in application and proper use of Loking tool for connecting male and female fittings, nipples, menders, or pipe to hose. *Punch-Lok Co.*

(30) Milling Cutter:

"Milling Cutter Data" is the title of this new book which is based on performance data taken directly from the field on jobs where specialized engineering has helped in solving production problems. Distribution is intended for key men, engaged in active production and tooling requiring the use of milling cutters and special tools. *Barber-Colman Co.*

(31) Automatic Transporter:

Bulletin features the automatic transporter, platform and pallet type motorized hand lift trucks applicable to all industry. The many features of operation, application and specifications are completely illustrated and described in this new six-page bulletin. *Automatic Transportation Co.*

(32) Chucks:

Vastly improved and streamlined catalog which has retained all essential data including renewal parts prices. This is termed a no research catalog because the information is so easy to find and read. Complete specifications are given together with a telegraph code and directions on ordering Westcott chucks. *Westcott Chuck Co.*

(33) Generators:

Katolight revolving field generators, series 667 and 670, can be furnished as independent two bearing generators suitable for belt or coupling drive or as single bearing generators designed to fit standard SAE engine bell housings. These generators are of a semi-enclosed, drip-proof design. Complete information is contained in the folder. *Kato Engineering Co.*

(34) High Speed Drill:

The Shankless drill is a new style high speed drill, with a continuous flute produced by roll-forging and hot twisting, and driven by a removable taper shank. Handbook gives detailed data on the drill together with advantages, price lists and dimensions for each type of drill and has a question and answer section. *Republic Drill & Tool Co.*

(35) Cold Finished Steel:

This brochure is the story of cold finished bar steel, what it is, how it is made, where it is used. It contains the many interesting steps in the production of modern steel. It concerns mainly the production of cold finished bars and industrial uses to which these quality bar steels are applied. *Bliss & Laughlin, Inc.*

(36) Profilers & Benders:

Two company bulletins, one on profilers—ruggedly built, accurate and extremely flexible machines with a wide variety of applications—and the other on automatic benders, which embody six distinct movements that take only a few seconds. Complete details of these machines, accompanied with photographs is available in the bulletins. *Pines Engineering Co., Inc.*

(37) Metal Hose:

12-page pamphlet on the flexible metal hose for every industrial use. Whether for reciprocating parts, vibration or manual, this metal hose has a type of product to meet the need. Sizes, specification charts and order procedure is also to be found in the pamphlet. *Chicago Metal Hose Corp.*

(38) Handling Material:

This is a bulletin with numerous handy hints for you in load and stockpile stabilization, and safety precautions to be taken in moving large quantities of material. It also shows the towmotors in action with a description of their many operations and their ability in solving manpower dilemma. *Towmotor Corp.*

(39) Finishes:

You'll get better finishes on your surface ground parts when your grinding wheels are accurately balanced. This booklet tells of new and better ways to balance the wheels, which is so easy, you will always keep them in good balance. *Pope Machinery Corp.*

(40) Cold Saw Machine:

Company bulletins—one on the heavy-duty cold saw machines with hydraulic feed, designed for fast cutting of steel bars, billets, structural shapes and forgings. Complete description and engineering data is contained in the booklet. Freedom's Might is the title of the other booklet, which is a pictorial and descriptive review of the company's machines. *Consolidated Machine Tool Corp.*

(41) Arc Welding:

General instructions for the use of arcloy tool steel welding electrodes are accompanied by illustrations of typical tool steel welds. Other sections of this manual are devoted to arcloy hot work tool steel welding electrodes, arcloy air hardening, oil hardening, water hardening and two pages of classifications of tool steels. *Alloy Rods Co.*

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THE IRON AGE, New York 17, N. Y.

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*Initial rejects were
between 80% and 90%*

*Radiography indicated
a change in procedure*

Rejects were cut to 5%

***Now only 1 casting out
of 10 need be x-rayed***

A FOUNDRY received an order for 200,000 aluminum alloy sand castings of various shapes, to be turned out at about the rate of 5,000 a week—and to receive 100% routine radiographic inspection.

Rejects the first week—for holes, cracks, and shrinks—were between 80% and 90%.

Functioning as an *inspector*, radiography separated the good castings from the bad—and so prevented considerable waste of man-hours and tool-time that might have been spent in needlessly machining defective parts.

But finding flaws through inspection, the foundry soon found out, was only one side of the story and the less important side at that.

What was more important was the way radiography showed how to *correct* faulty castings through improved foundry practice. Seeing what was wrong inside made correction easier.

And as a result, rejects dropped to 5% or less. In fact, it is now necessary to radiograph only 1 casting in 10.

To help radiography inspect and correct most efficiently, Kodak (1) supplies a line of films, solutions, and accessories and (2) invites you to share in the experience accumulated in 17 years of research in this field. Eastman Kodak Company, X-ray Division, Rochester 4, N. Y.

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HERE'S an example — thin steel gears, measuring 6" O.D. x 4 $\frac{5}{8}$ " I.D. x .075" thick, are ground on both faces AT THE RATE OF 25 TO 30 PIECES PER MINUTE, PER CUT!

The machine is a No. 84A-30" Gardner PRECISION Double Grinder, equipped with our "push-through" type fixture. The gears are fed from an inclined chute, into a pair of rubber feed-rolls, which send them through the opposed grinding wheels on steel guide bars, in a continuous stream.

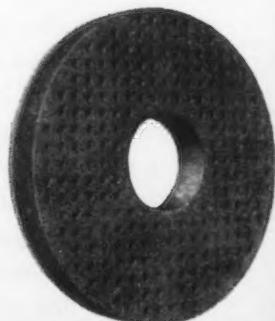
Two cuts are taken, the first in the soft state, removing about .008" overall stock; the second cut, after hardening, removes approximately .002" stock. TOLERANCES: .001" for size, or uniformity, and .0005" to .00075" for parallelism!

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Now!

At Kropp Forge we are already working with designers of postwar machines and equipment.

It is gratifying, though not surprising, to note that a more extensive use of forgings is involved in the equipment of the peacetime era. Forgings have liberally proved their worth in armament applications — notably in resistance to tensional, torsional and compression stresses. Forgings are coming out of the war with a greatly enhanced reputation.

Forgings provide metals at their ultimate strength. They save metal, weight and space because their greater strength permits the use of parts of less bulk. With forgings there is less incidence of internal defects and less scrap. Forgings require less time to machine and finish, with proportionately lower tool costs.

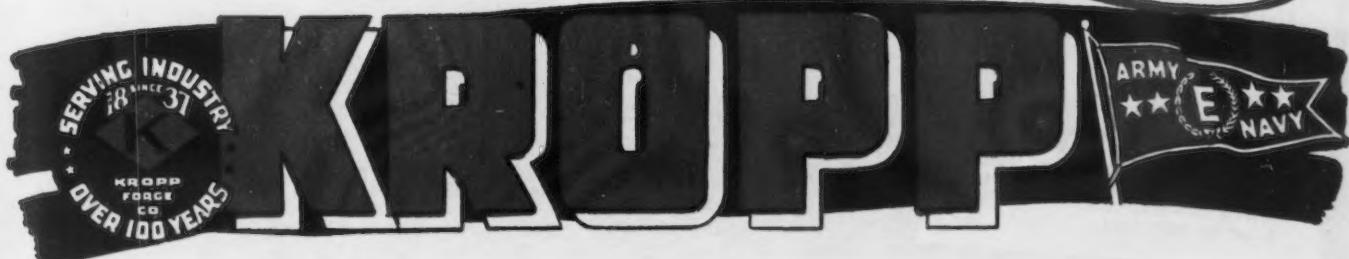
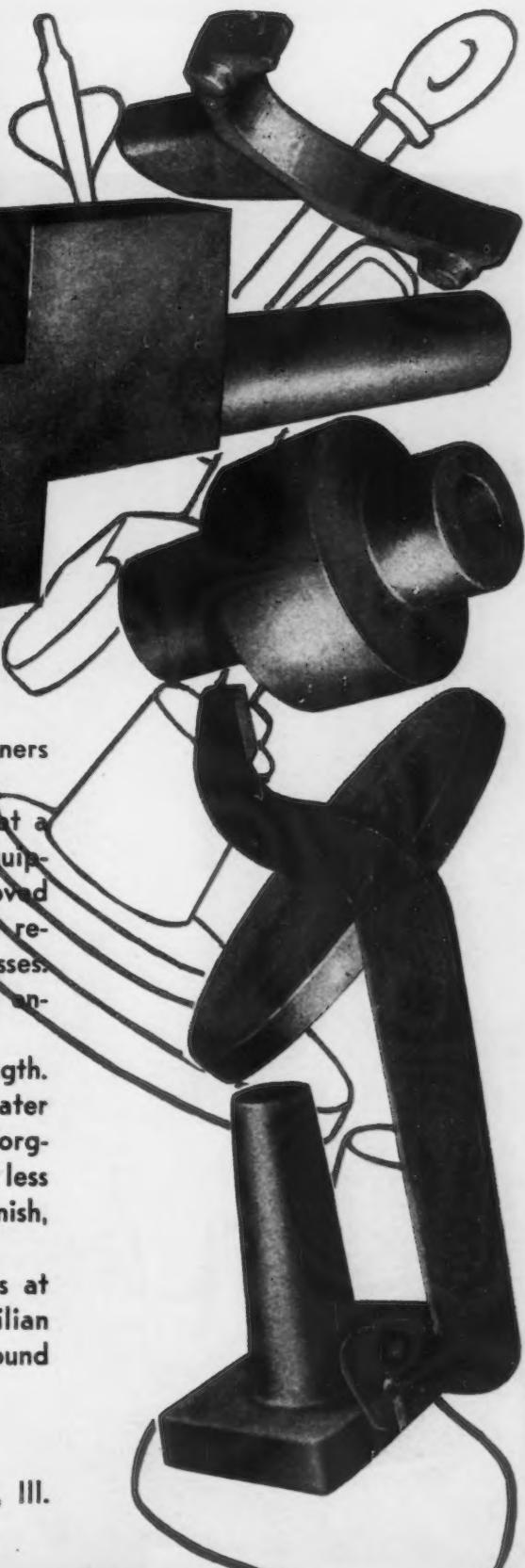
As our war assignments are completed, facilities at Kropp Forge are becoming available for essential civilian applications. Design your postwar products around sound Kropp flat die, drop or upset forgings.

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These illustrations show Farquhar Presses in operation at the Fairchild Aircraft Division, Hagerstown, Maryland.

(left) Farquhar 75-ton Straightening Press in the tool room straightening a press brake die.

(right) Farquhar 150-ton Straightening Press straightening the landing gear leg for a Fairchild PT-19 Trainer. This press is also used for straightening other steel parts and for pressing in large bearings and bushings. Quoting Fairchild: "These presses are especially useful where very accurate work is required. The load gauge has proved to be a great aid in the operation of this

Get Your Copy TODAY!

This 48-page catalog is a complete picture story of the many types of Farquhar hydraulic presses showing war applications . . . suggesting peacetime uses. Write Farquhar for your copy.



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FOR FASTER, BETTER WORK... At Less Cost—

Recognized for their speed and accuracy, their quick response to control, Farquhar Hydraulic Presses everywhere are producing more at lower cost. Their heavy duty construction means longer life with a minimum of maintenance.

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type of equipment as it assures the operator that no overload will be imposed."

Within the range of from 3 to 7,200 ton capacities, there's a Farquhar Press to fulfill your needs . . . to do that new or old job better, faster—at less cost. Get a copy of the new Farquhar Hydraulic Press Catalog . . . a 48 page picture story of the many types of Farquhar Presses with specifications and installation photographs—examples of Farquhar's service to industry everywhere.

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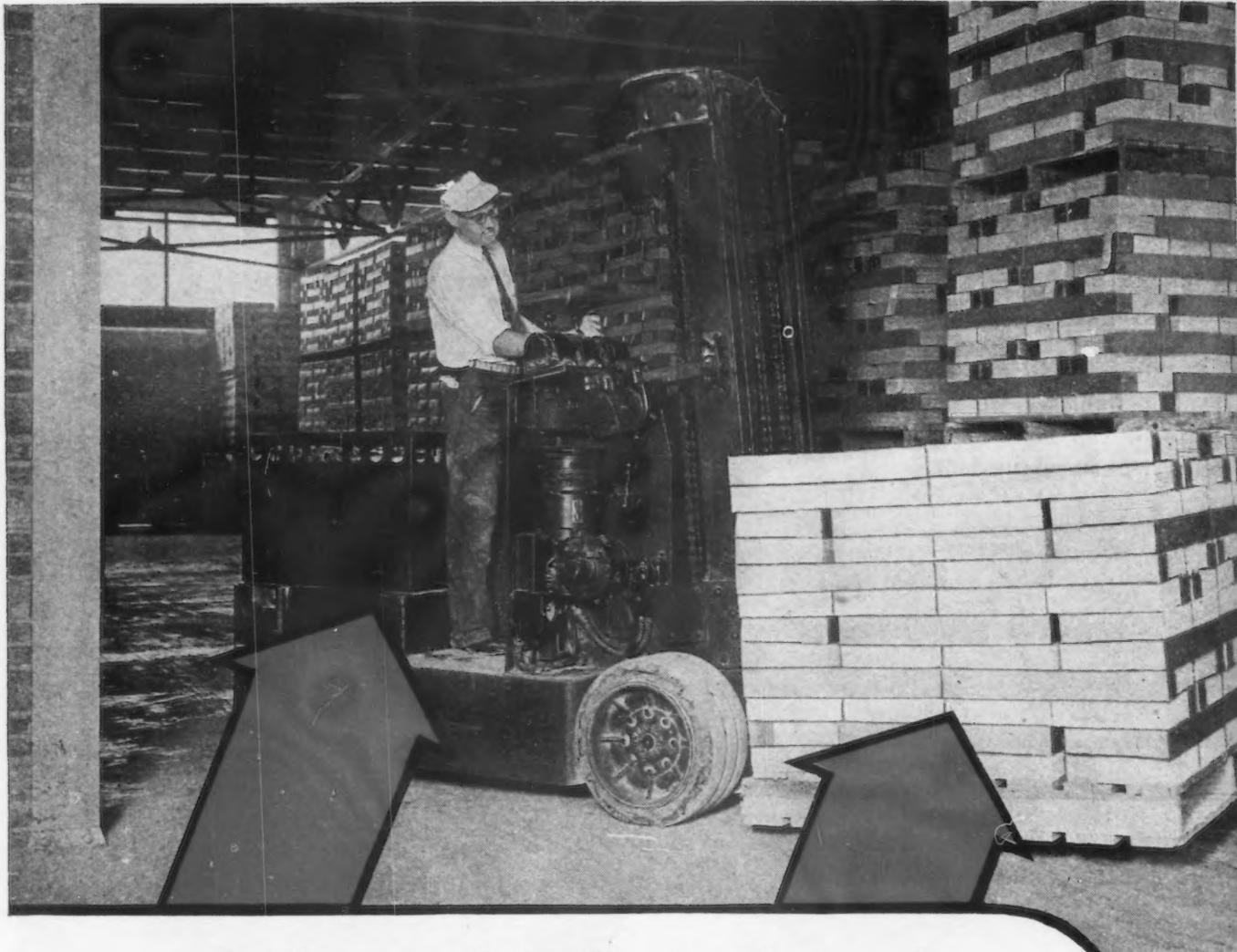
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MUCH of the vast tonnage, that's rolling over rail and highway, received its first ride—and many following ones—as palletized loads, on electric industrial trucks powered by Exide Batteries. It's a result-getting combination...an efficiency team that helps to speed up production by cutting corners in materials handling.

To maintain the faster, steadier pace that palletizing makes possible, batteries must have abundant power and endurance. That Exide Batteries have plenty of both is amply proved by their widespread use in shipping and receiving departments, in warehouses, and on miles of loading platforms throughout the land. And wherever they are used, Exides are performing with dependability, long-life and ease of maintenance.

Write us for a FREE copy of the bulletin "Unit Loads," prepared by the Industrial Truck Statistical Association. It tells how to cut handling costs up to 50%... covers latest developments in materials handling...and includes actual case histories.

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IT'S OVER, OVER THERE



Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32

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Questions and Answers from The Old Hammerman's Note Book

Aircraft Forgings . . .

- 1 Are tensile strength, endurance limit, wear resistance and impact strength and ductility superior in directions (a) parallel to flow lines? (b) at right angles to flow lines? (c) at any angle to flow lines?
- 2 By what process is it possible to direct metal flow lines to obtain increased tensile and impact strength, toughness, wear resistance and endurance limit? (a) by casting? (b) by forging in closed impression dies? (c) by stamping?
- 3 Why is it important for aircraft design engineers to thoroughly understand the fibre-like flow-line structure of steel?
- 4 (a) How are designers taking advantage of the inherent value of forgings?
(b) Why?
- 5 How are you preparing for Forging Sales post-war?

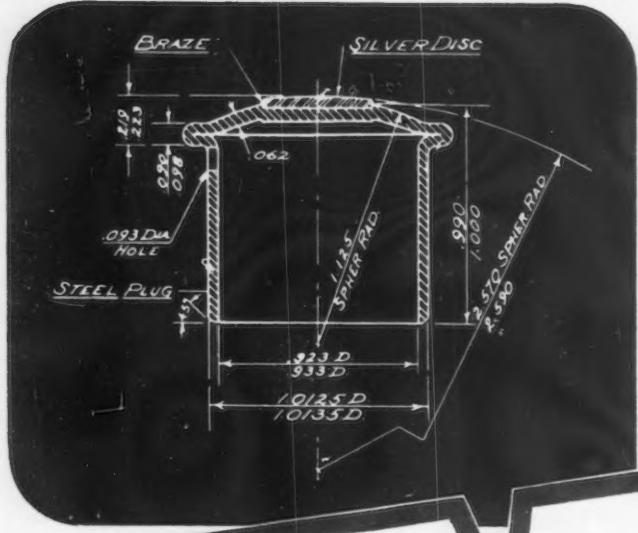
- 6 Perhaps we can help you in your post-war planning.
- in the greater factor of safety in forgings.
- possible in view of weight in the five faith aircraft. 4(b). Because armament have faith
- By specifying forgings wherever
- how lines for safety of aircraft.
- So that they may design parts to utilize fully all the values inherent in dies.
- (b) By Forging in closed impression dies.
- (a) Parallel to flow lines.

ANSWERS

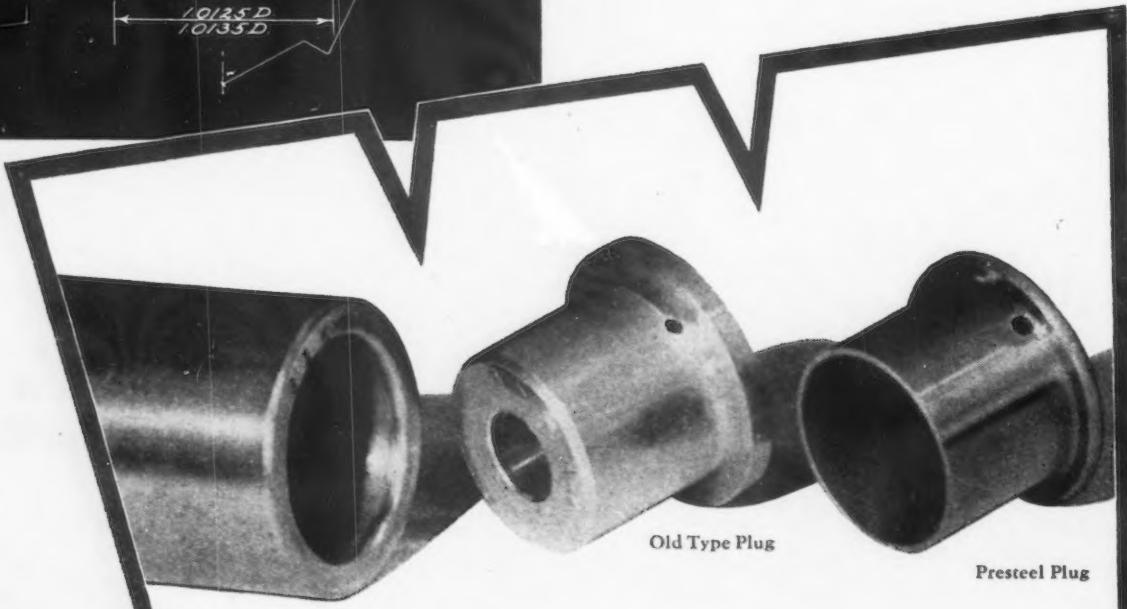


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An outstanding Presteel achievement has been the development of drawn steel piston pin plugs to replace plugs machined from solid aluminum rod. These plugs are used in the ends of the piston pins of aircraft engines. As there are two plugs in each cylinder and replacements are fairly frequent, a considerable tonnage of critical aluminum

was saved. The old type plug, shown on the left above, weighed 1.28 oz. as compared with .91 oz. for the drawn plug, shown on the right, yet the new plugs have superior wearing qualities. Thin silver discs are induction brazed to the heads of plugs. For further details of this unique assembly, write to:

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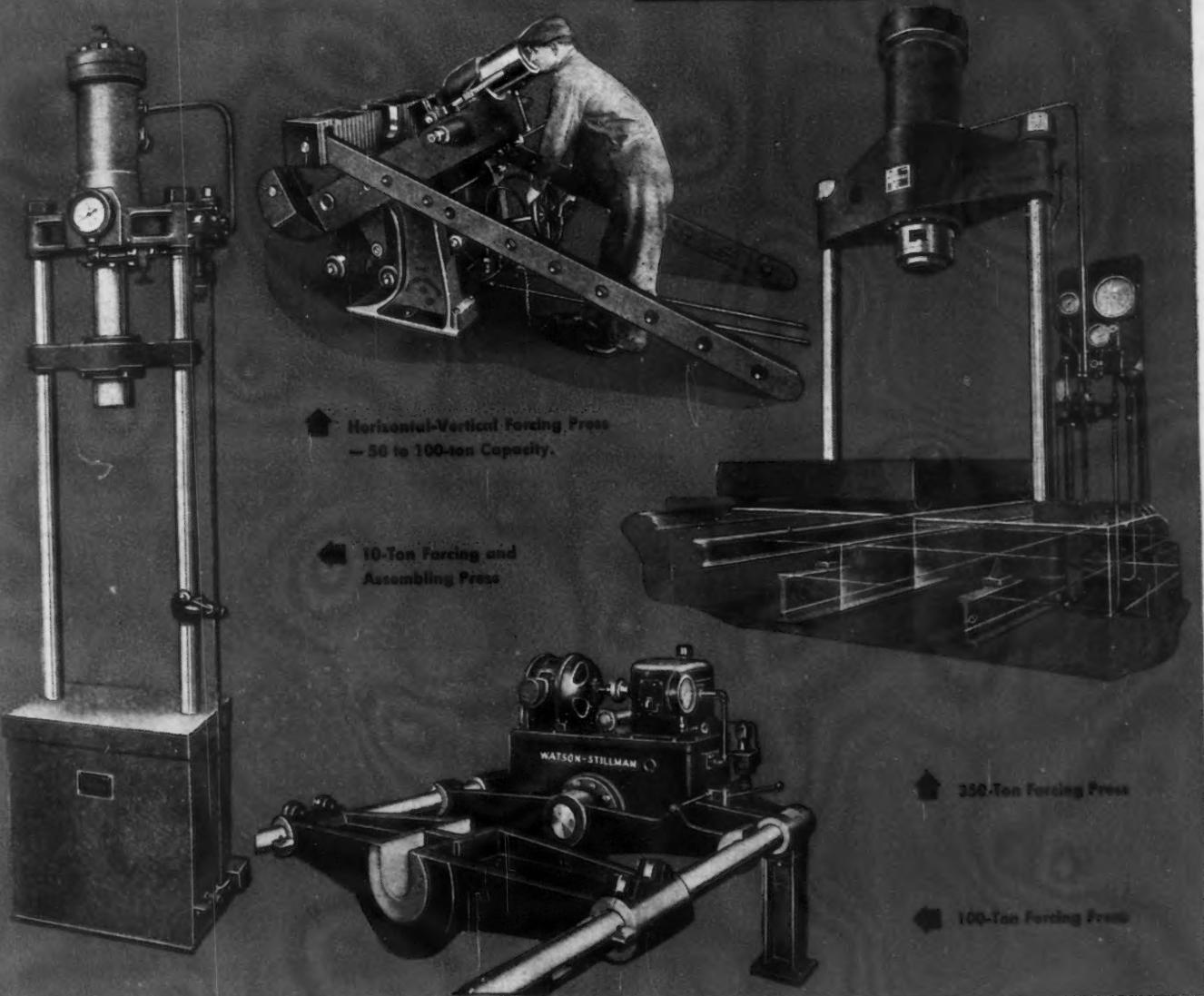
WHETHER YOUR SHOP schedule calls for forcing wheels, pinions, gears, bearings or bushings on axles or shafts...or removing them, once they're pressed on...or for other similar assembly or dismantling jobs...you'll find your answer in the wide-ranging line of Watson-Stillman Forcing Presses. Some of these units perform a large number of these operations with but slight adjustment. Others, as is evident from their design and construction, are made for more specialized functions.

These presses range from small compact units to large tonnage machines for handling heavy work on a traversing platform. Each is self-contained, quick-acting and oil-operated. Each performs its forcing operations smoothly, with a minimum of shock and maximum freedom from pulsation under pressure.

Only a few of the many available types and sizes of W-S Forcing Presses are shown here. Write for detailed information on these and other W-S Hydraulic Presses for forming, forging, flanging, straightening, shearing, piercing, bending, assembling, and other metal-working operations. Send for General Bulletin 110-A. The Watson-Stillman Co., Roselle, New Jersey.

WATSON-STILLMAN

Designers and Manufacturers of Hydraulic Equipment, Forged Steel Fittings, and Valves



Unique Agitation Saves Time and Labor . . . Gives Better Cleaning

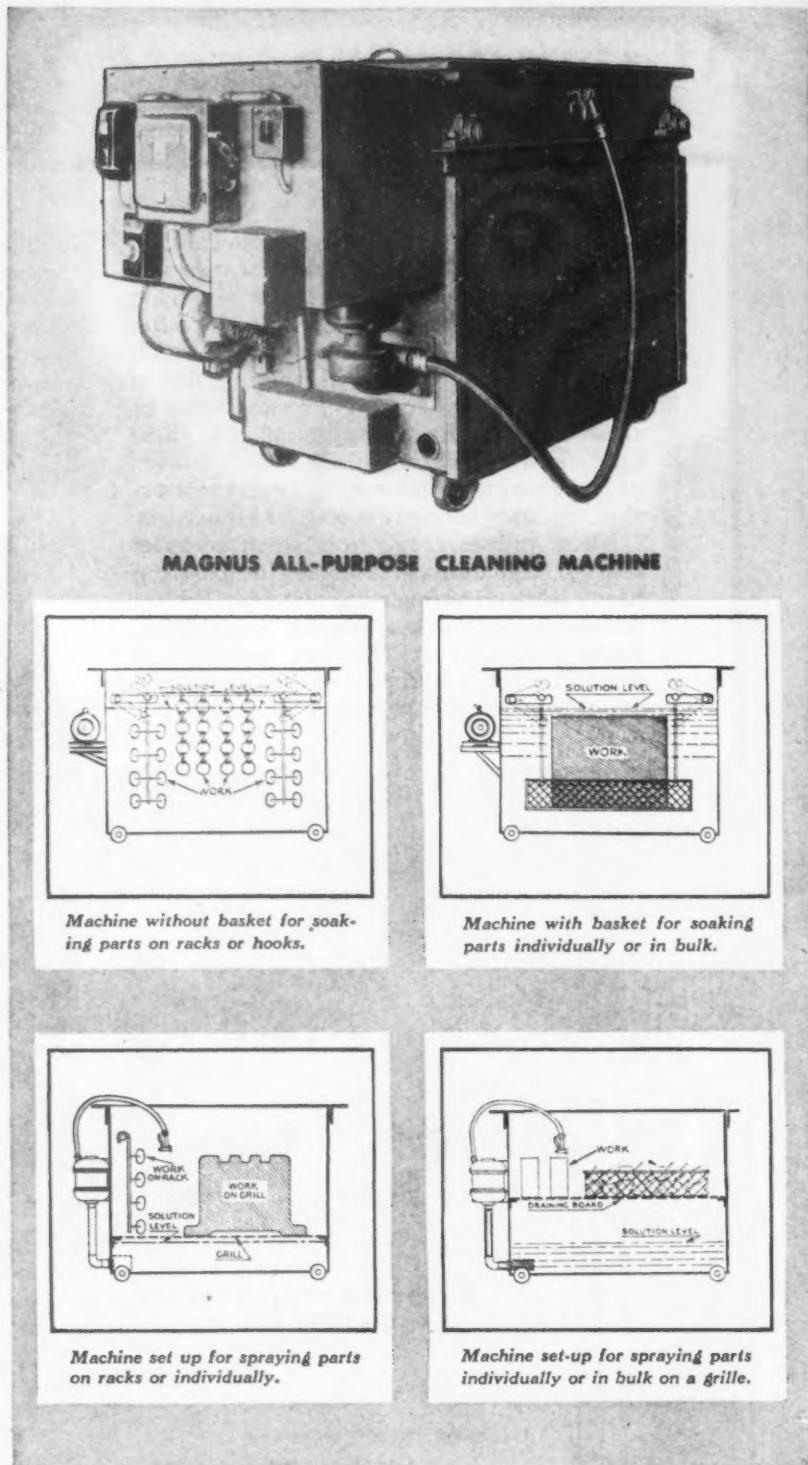
The Magnus All-Purpose Portable Cleaning Machine is based on a unique method of agitation in which the work is repeatedly raised and lowered in the cleaning solution, providing an energetic swishing action which insures better cleaning and greatly speeds the cleaning process.

Used with Any Cleaner—alkaline, petroleum spirits, chlorinated solvents or emulsifiable solvent.

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Used for Any Set-up—for precleaning, agitation-soak and/or spraying and combined processes for washing and rinsing.



Bulletin 3600 Tells the Complete Story

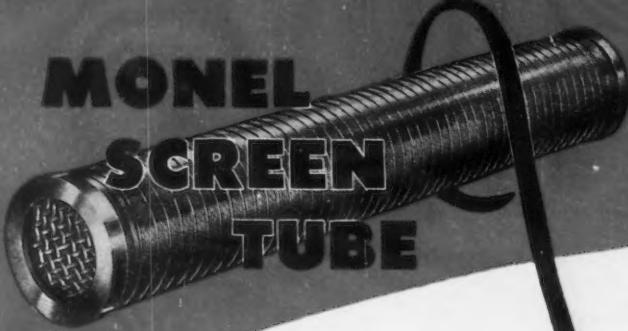
Write for this description of this unique machine and its applications. Prices range from \$300 to \$800, depending on capacity and type of heating provided.



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CLEANERS-METHODS-MACHINES

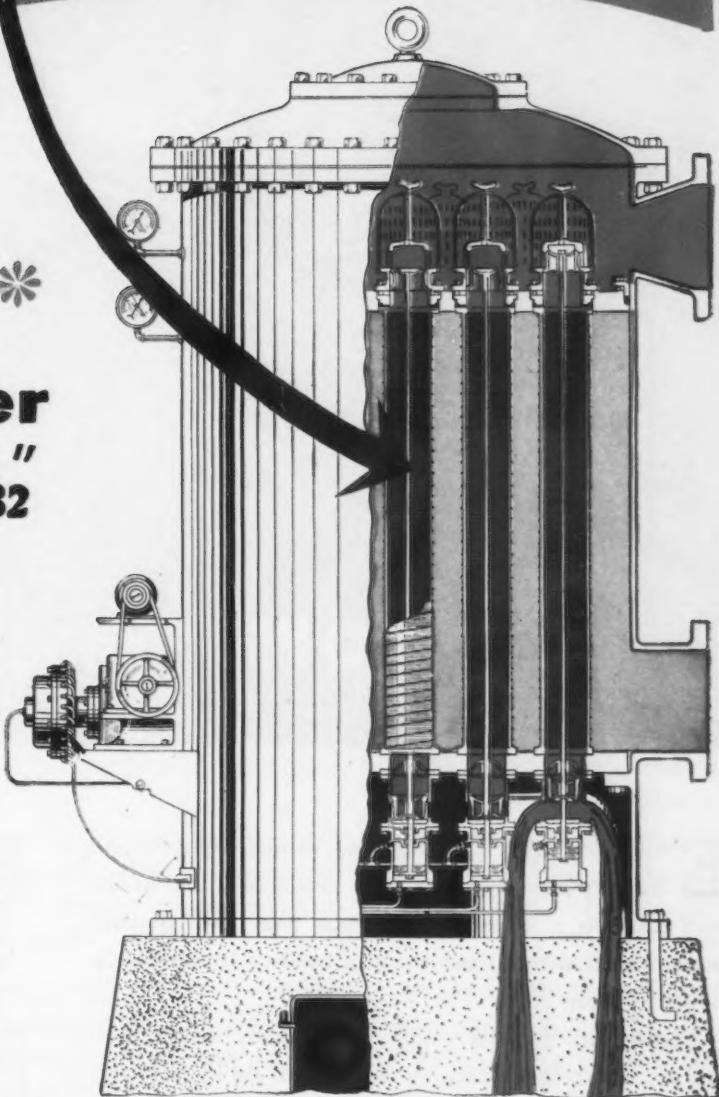
ADAMS AUTOMATIC WATER FILTERS



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GRIT and DIRT*
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***15 times finer than $\frac{1}{32}$ "**

Adams Poro-Screen Filters offer a practical answer to large-scale filtration of dirty river water for use in hydraulic equipment. Designed for continuous, automatic operation and requiring a minimum of attention, Adams Automatic Filters supply the required volume of clean water for your operations—water free of dirt and grit which damage bearings, rolls, valves and other equipment. Highly successful on water cooling installations of open-hearth and heat-treating furnaces.

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PORO-STONE
AND
PORO SCREEN

FILTERS



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ENGINES, arms, projectiles, armor—almost all military equipment is now made of alloy steels, and the use of alloying materials has been greatly economized without sacrifice of quality by the addition of Boron.

Implements of peace also—machinery, tools, containers, structural parts—are and will be in growing measure made strong and durable by improvement of the steels and irons that go into them; and again the improvement will be economically brought about by aid of such hardening agents as Boron. Available supplies are adequate. The percentages that give best results are almost incredibly small. The Molybdenum Corporation has developed a ferro-boron that dissolves easily in molten metal and yields a high recovery.

Inquiries concerning any use of Molybdenum, Tungsten, or Boron will be welcomed.

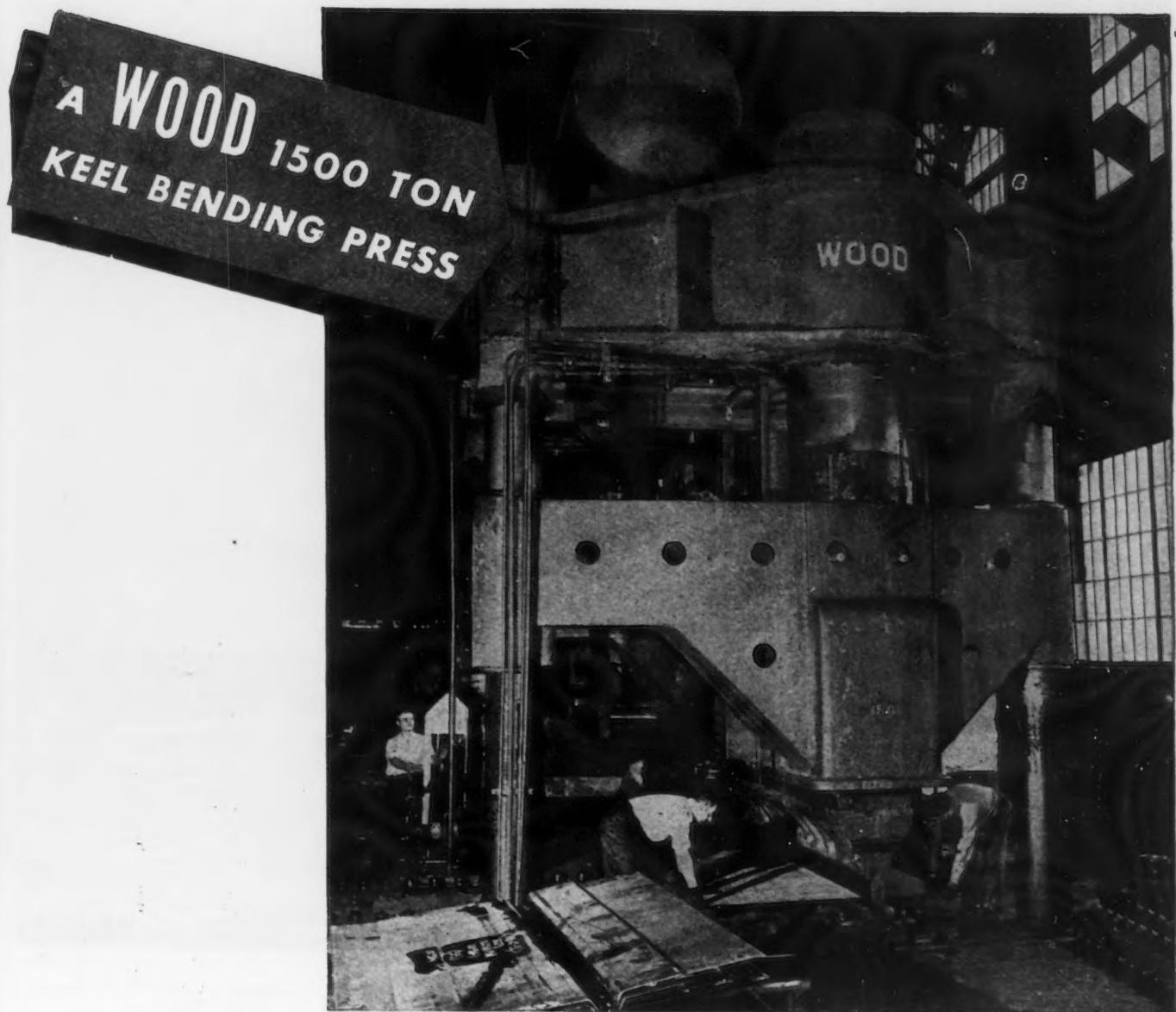


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MOLYBDENUM

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Hydraulic presses have long been essential equipment throughout the Nation's busy shipyards. Wood presses are quickly and efficiently doing jobs of bending, forming, straightening, forging and pressing, etc.—helping to speed construction of America's bridge of ships.

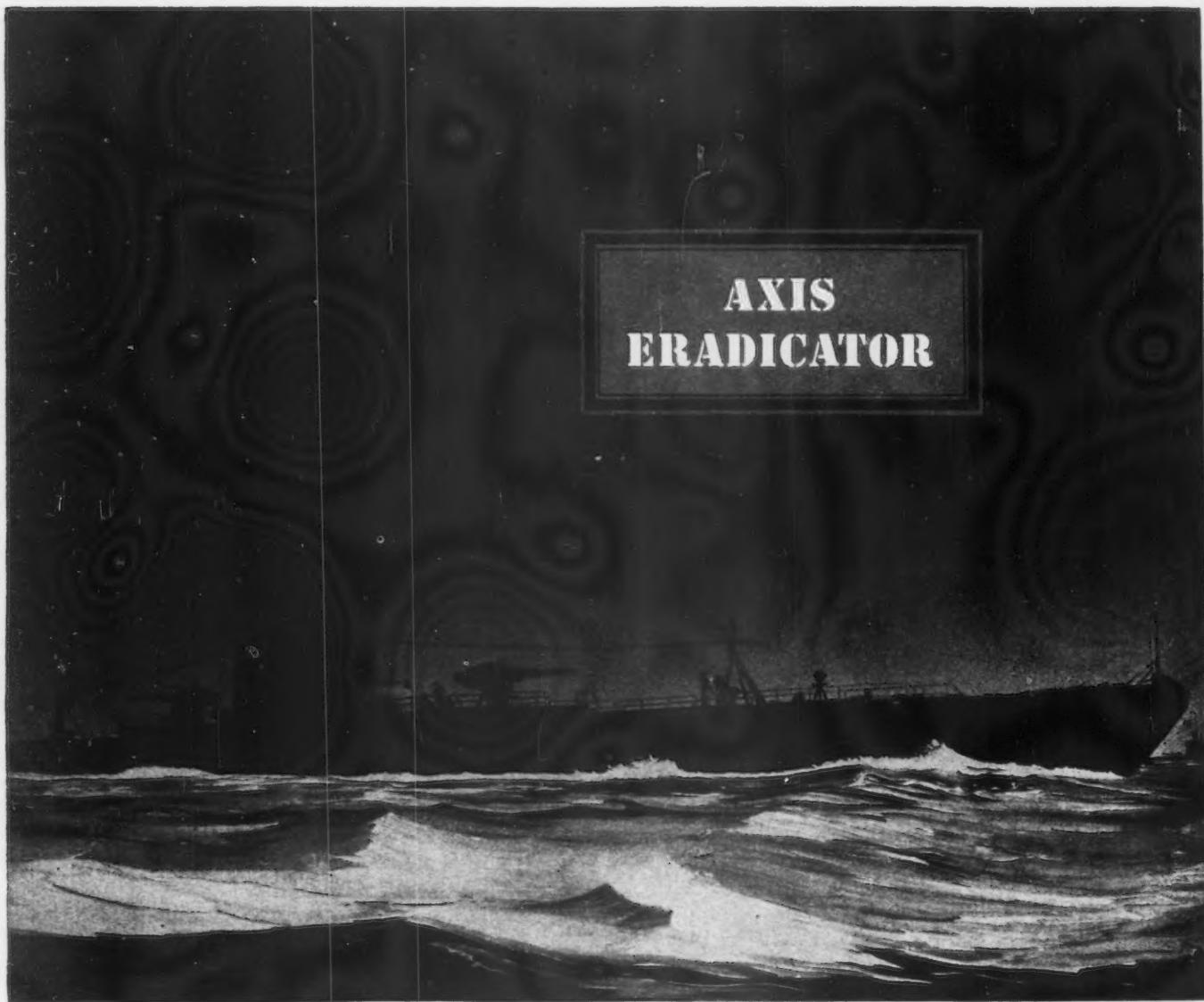
The press shown here, a recent Wood development, has a record of such achievement. Standing approximately 30' high, this unit has two main rams of 48" stroke. The clear distance between columns, right-to-left, is 9' 10" and the front-to-back is 11' 10". The moving platen can be inclined, front-to-back, as much as 11½ degrees from the horizontal.

Consult R. D. Wood engineers on your hydraulic problems.

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are used in ever increasing amounts by the builders of these and other "axis eradicators".

From periscope to torpedo, the submarine is a precision built instrument of destruction. It is essential that its constituent metals be above reproach in quality and uniformity.

Federated brass and bronze alloys are of uniform high quality due to advanced technical knowledge and precision control of metallurgical processes.

Federated Metals will meet your requirements and save you money. Your inquiry will receive prompt attention from the Federated Office nearest you.

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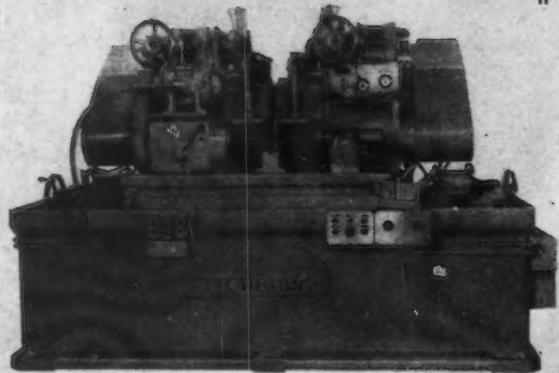
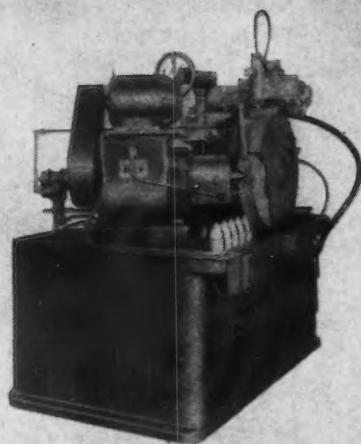
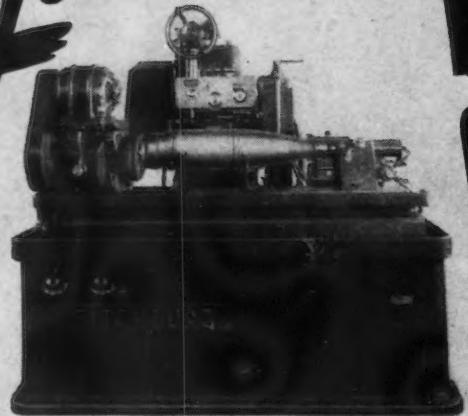
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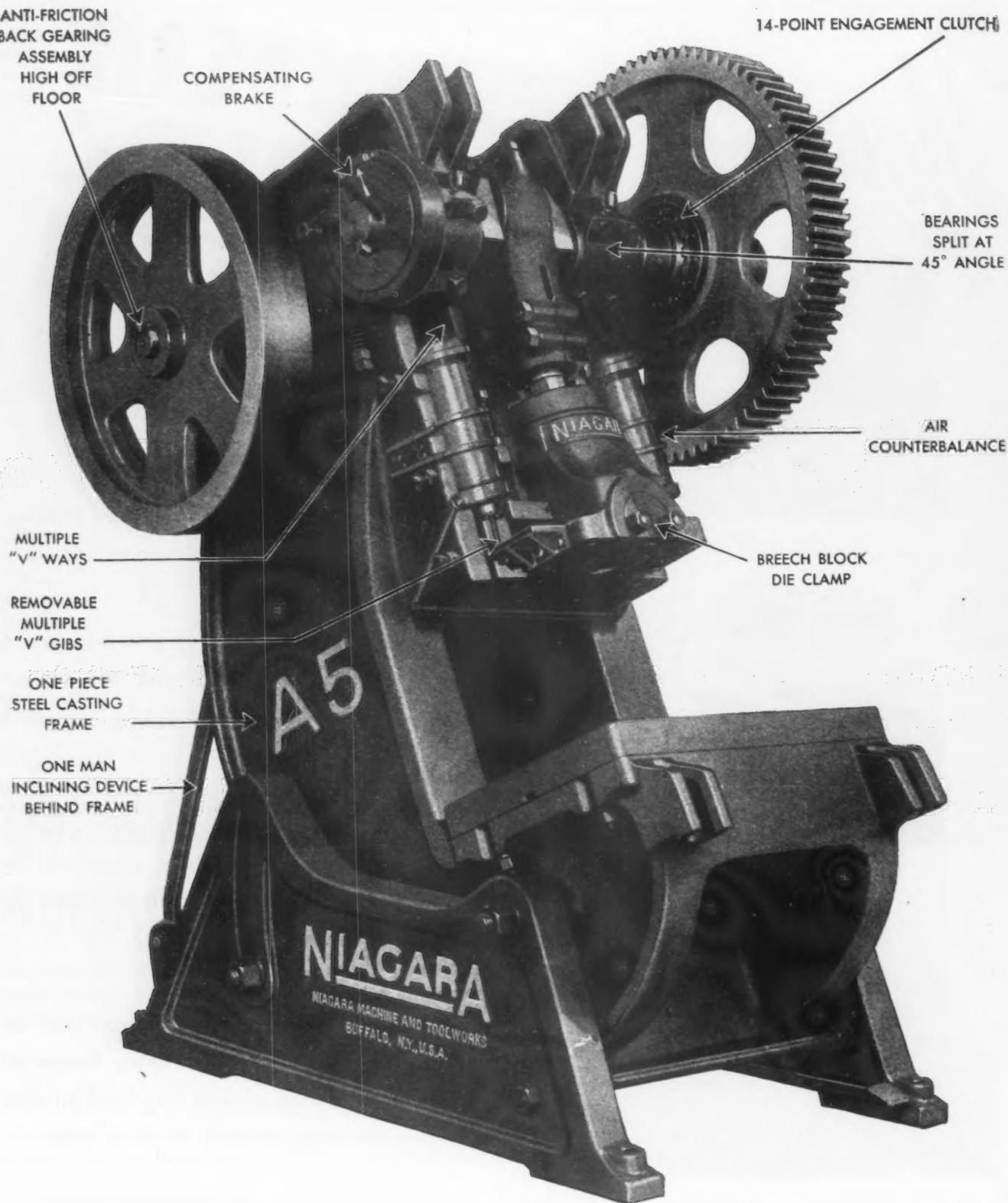
With reconversion ahead Fitchburg users should keep in mind all Fitchburg Bowgage Head Precision Grinding Wheelhead Units are standard and interchangeable.

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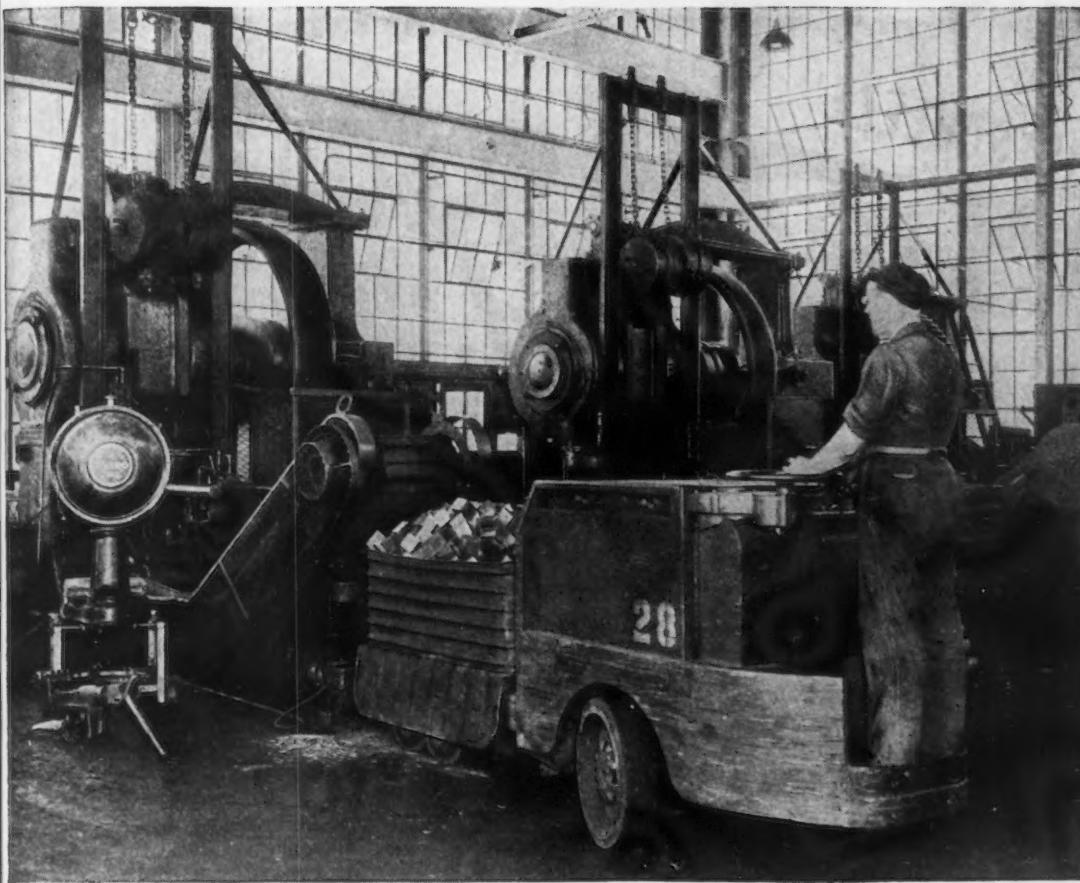
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ALKALINE BATTERIES

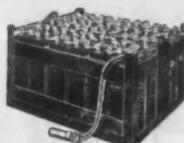
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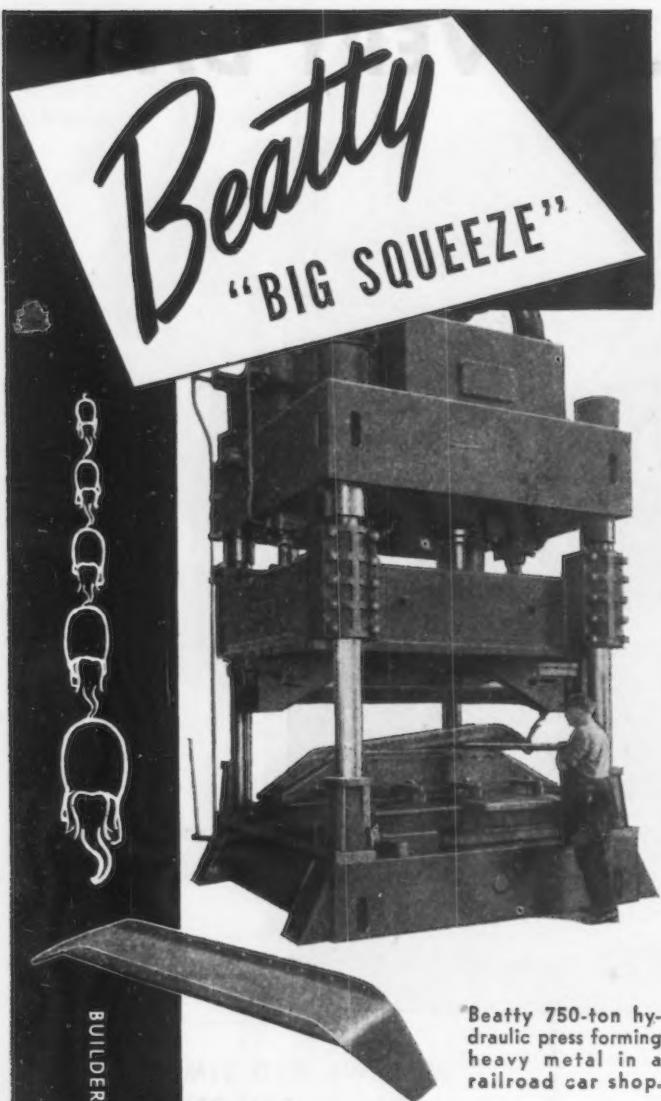
*A Typical Example of
Alkaline Battery Dependability*

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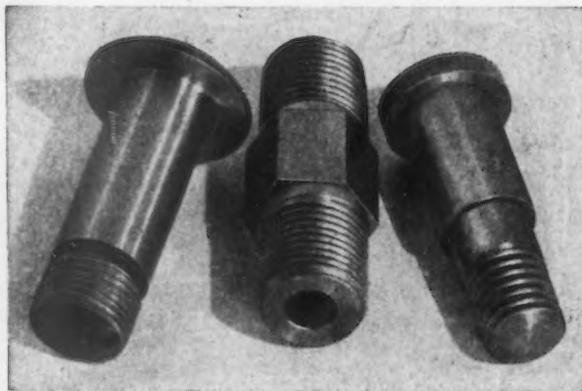
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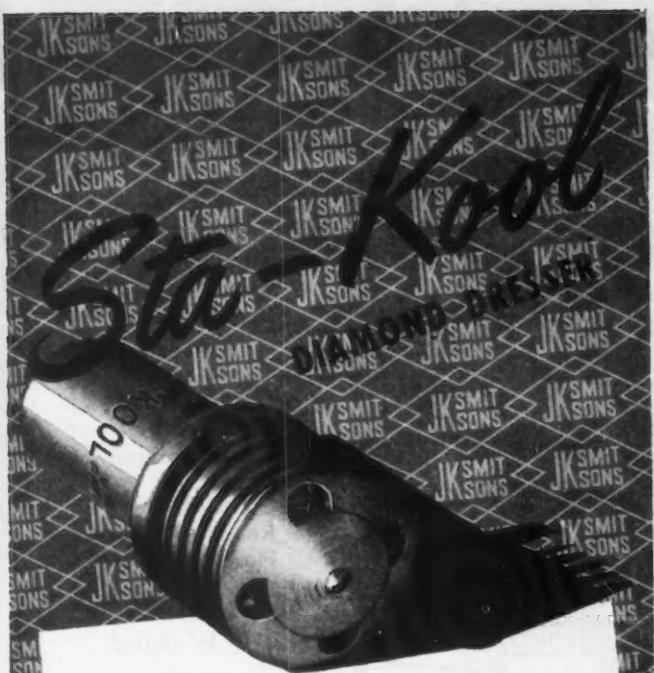
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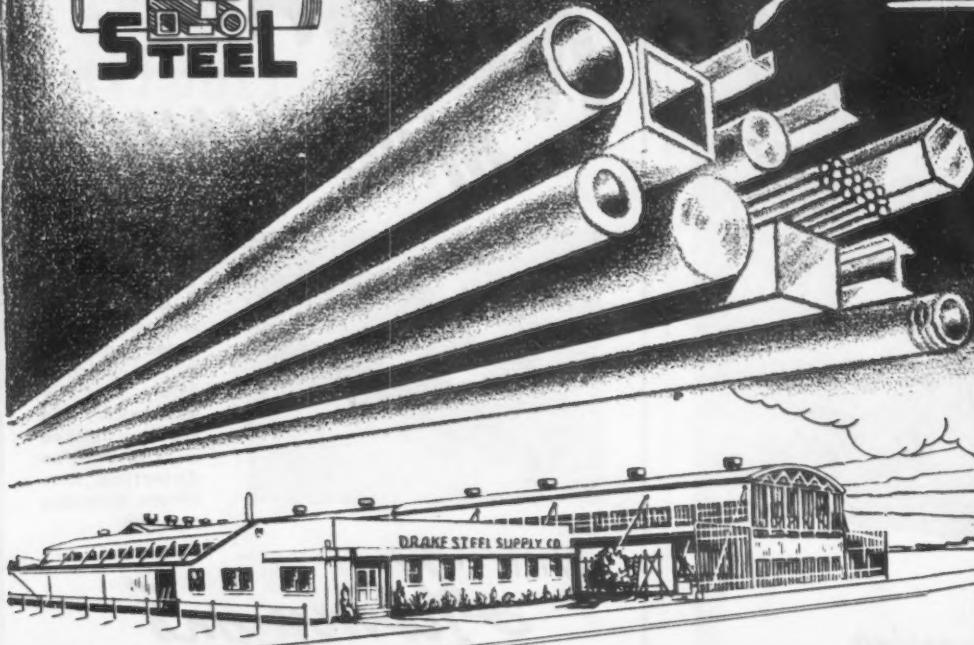


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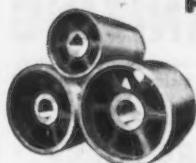
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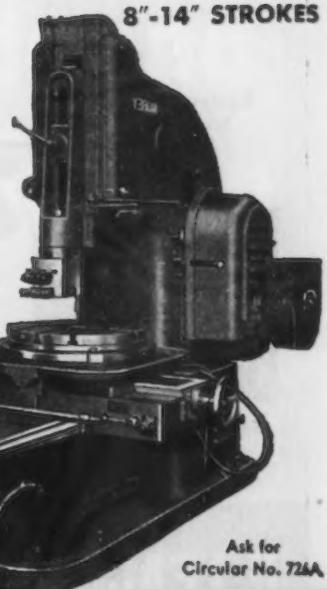
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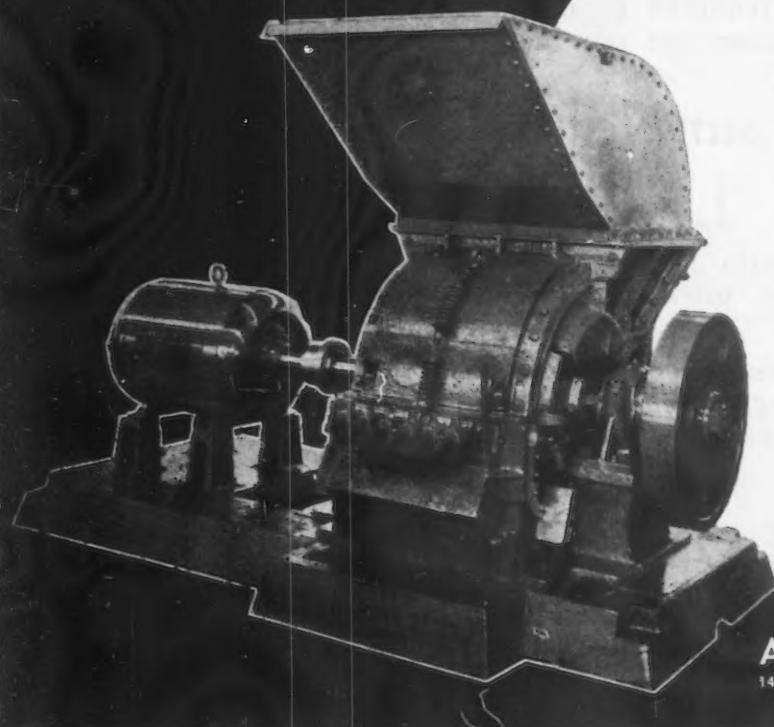


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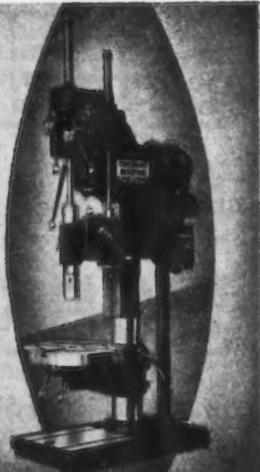
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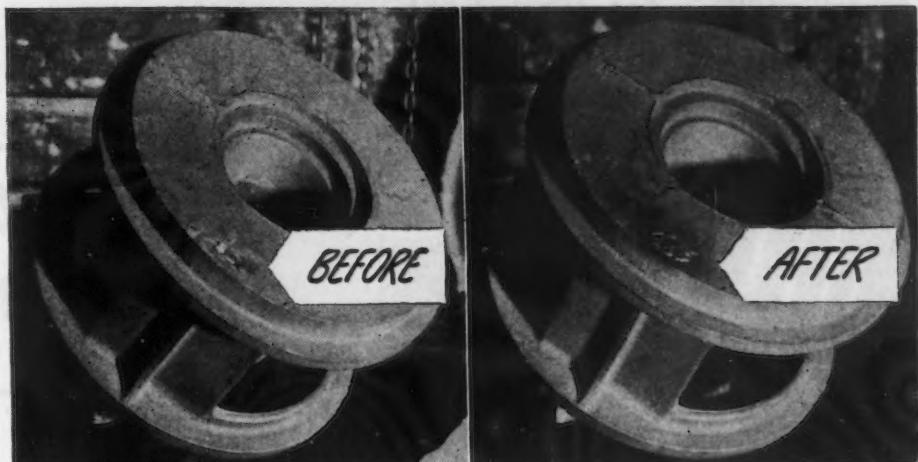


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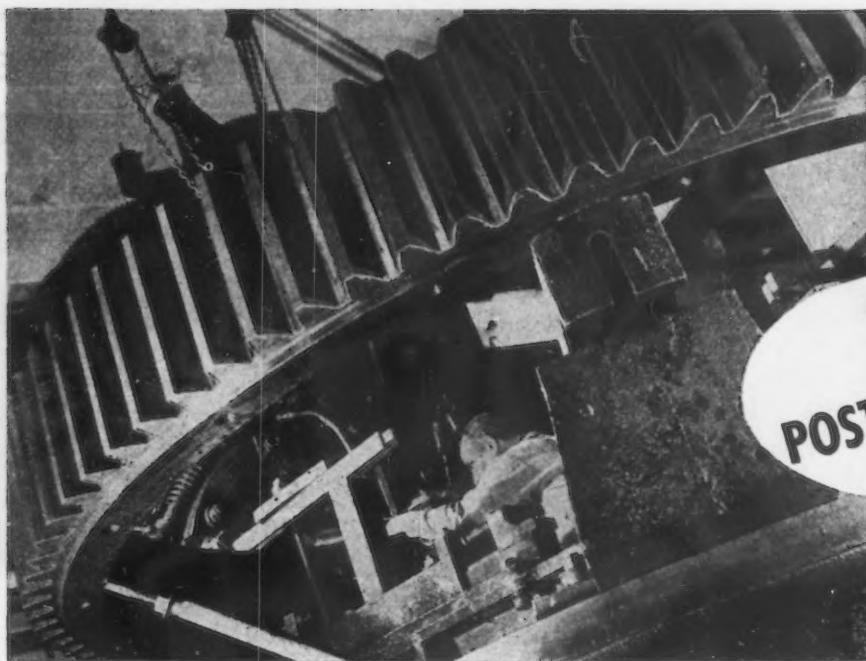
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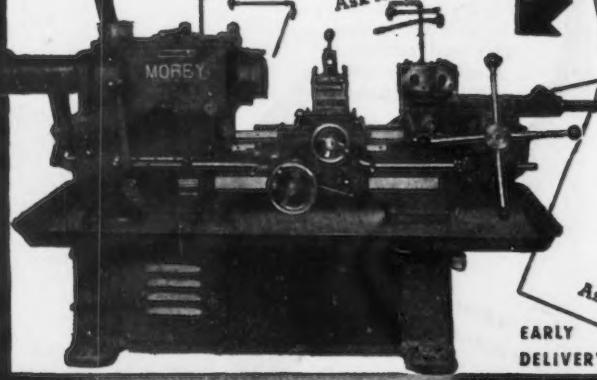
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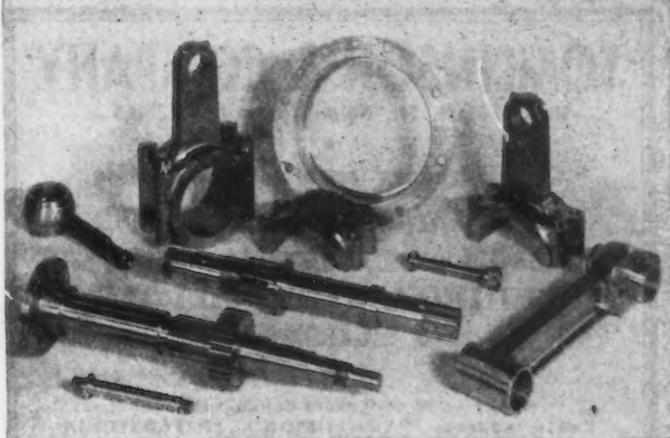
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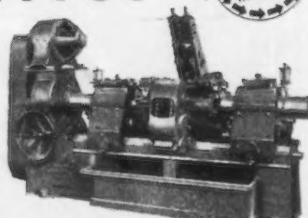
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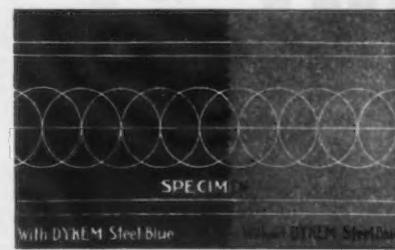
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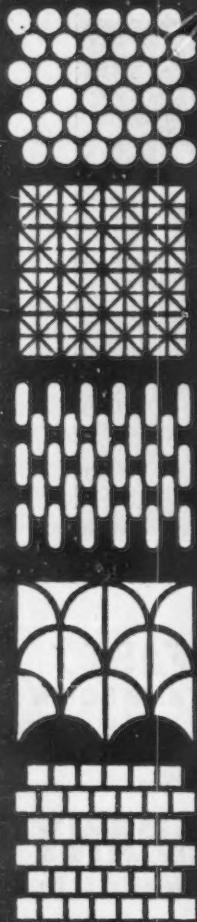
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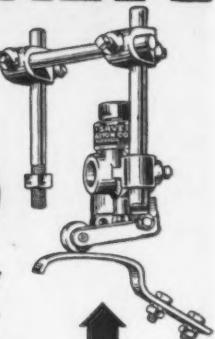
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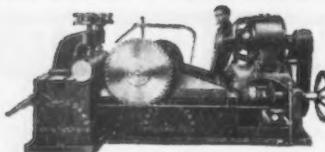
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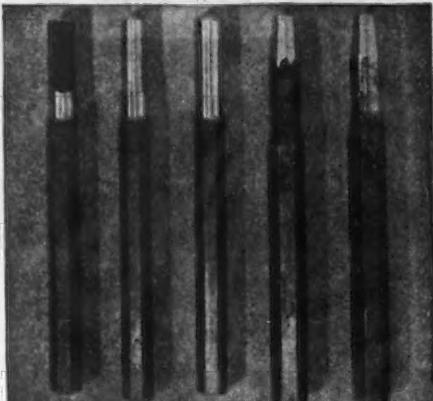
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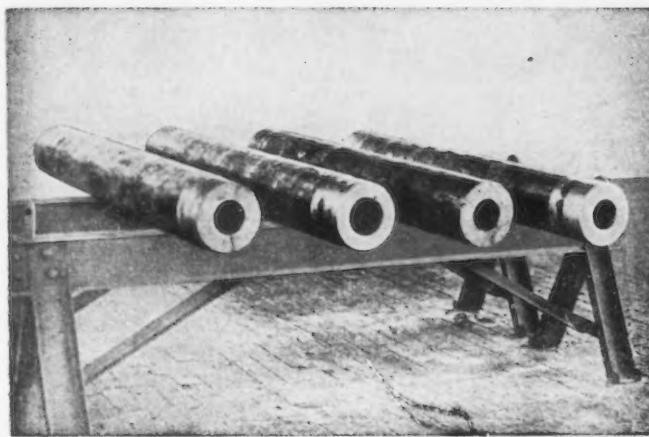


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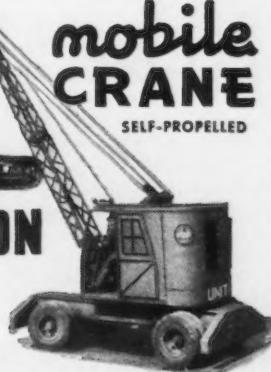
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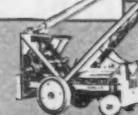
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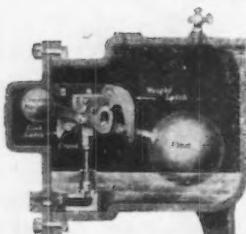
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6"x6"x3½" Hillies & Jones #2 Double Angle Shear

8"x11" Cleveland Double Angle Shear, Arr. M.D.

SHEAR—GATE

8" Bertsch Gate Shear, Motor Driven. Capacity

SHEAR—ROTARY

#60 Quickwork Rotary Shear. Motor Drive 18"

Throat. Capacity Shear 1" Plate

STRAIGHTENERS

Sutton-Abramson Straightener, M.D. Capacity 1½"

to 3" Round

Sutton-Abramson Straightener, M.D. Capacity 3"

to 6" Round

TESTING MACHINES

10,000# Olsen Universal Testing Machine, M.D.

Including Extended Columns for Wire Testing

30,000 lb. Riehle Bros. Universal, B.D.

WELDERS

500 Amp. Lincoln Arc Welder, Portable Type SAC.

Rating 40 Volts Nema. Motor 220 volt, 3 phase,

60 cycle

250 KVA Thompson-Gibbs Model F28 Flash Welder.

410/60/single ph. Complete with elec. equipment

75 KVA Federal Mcne. & Welder Co. Spot Welder.

440 v. 50 or 60 cy.

WIRE DRAWING MACHINES

#3 Waterbury-Farrel Bull Block, M.D. 22" Diameter

Block. Capacity #5 Red

#10 Morgan Horizontal Bull Block, M.D. 30" Dia.

Block. Capacity ¾" wire. Including Langeller

Swager if required.

Pittsburgh Office

920 Park Bldg.

• Manufacturing

Pittsburgh Phone

Atlantic 1208

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IMMEDIATE DELIVERY

No. 25-B DEFIANCE HORIZONTAL BORING MACHINE, 3½" bar—new in 1941

36"x36"x8" WOODWARD & POWELL PLANER, with two heads and reversing motor drive

72"x48"x24" GRAY PLANER, two heads on rail, reversing motor drive—price \$4500.00

3" bar UNIVERSAL HORIZONTAL BORING MILL, motor drive, table 30"x42"

18" LIBBY TURRET LATHE, 3½" hole, arranged for motor drive

4-spindle HENRY & WRIGHT BALL BEARING DRILL (II)

24"x36"x10' INGERSOLL HORIZONTAL SPINDLE SLAB MILLING MACHINE, arranged for motor drive

26"x25"x12' INGERSOLL ADJUSTABLE RAIL MILLER, arranged for motor drive, one head

7—No. 2 CINCINNATI VERTICAL MEDIUM SPEED MILLERS, latest dial type

9—No. 1—18" CINCINNATI PLAIN AUTOMATIC MILLERS, latest model

10—No. 1—12" CINCINNATI PLAIN AUTOMATIC MILLERS, latest model

HILL-CLARKE MACHINERY COMPANY
647 Washington Boulevard
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Assorted Automatic and Hand Screw Machines, Boring Mills, Drills, Gear Machinery, Grinders, Lathes, Milling Machines, Planers, Shapers, etc.

See our list page 222

Dec. 21st Issue

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OPENSIDE PLANER, 48" x 48" x 19'

DETTRICK & HARVEY, 3 HEADS

LOW PRICE FOR QUICK SALE

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FOR SALE

Barnes #78 Precision Grinder

Porter Cable Belt Sander—G-8

Litharge Universal Atmospheric Furnace Model HDII 18369

Litharge Furnace Model PLD #236

DeWalt Abrasive Saw—18" Model MIE

4-Spindle Vertical Drill Press—#2 Allen

Rotary Coal Crusher—#00 Sturtevant

McCaskey Filing Cabinets—#972

Conveyor—Jervis B. Webb

Blast-Cleaning Cabinet and Dust Exhauster—Pangborn

K. O. Lee Tool Grinder—Model #A600

Delta Double-Spindle Drill Press—#17

Magnaflex Machine—ANQ-483

Henry-Wright Drill Press—#2

Hisey-Wolf Seag Grinder—#4LA Model 5

Inquire: TALON, Inc.

Box 445, Meadville, Pa.

6" x 15" J & L Thread Grinders

No. 5 Cincinnati Plain Mill, S.P.D.

Gridley Model H 4-spindle Chucking Ma-

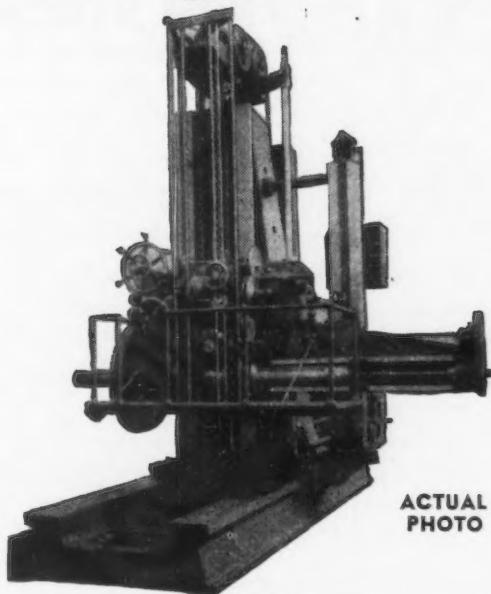
chines, M.D.

D. E. DONY MACHINERY CO.

47 LAURELTON ROAD, ROCHESTER 9, N. Y.

THE CLEARING HOUSE

PRICED FOR ACTION!



ACTUAL PHOTO

8" NILES BEMENT POND HORIZ. BORING MILL, Travel of Bar Approx. 6' 7"; Overall Length of Bed 25'; Overall Height of Col. 19½"; M.D. with Motor.

MILLING MACHINES

PLAIN:

- No. 5-B BROWN & SHARPE, M.D., Grd. Head.
- No. 4 LeBLOND, Heavy Duty, Geared Head.
- No. 4 CINCINNATI, 16½x64" Table, M.D.
- NEWTON KEYWAY MILLER, P.F.

PLANER TYPE & SLAB:

- 42"x42"x13" INGERSOLL SLAB.
- 42x36x6" B&S OPENSIDE PLANER TYPE.

PRODUCTION:

- No. 45 PRODUCTOMATIC, Rotary Table.
- 2-18" CINCINNATI Automatics, 9½x30" Table.
- 10" PRATT & WHITNEY Semi-Auto., 6½x18" Table.

THREAD:

- 6x72" & 6x48" PRATT & WHITNEYS, M.D.
- No. 3 LEES-BRADNER.

VERTICAL:

- Nos. 3 & 2 BROWN & SHARPE.
- No. 2½-B KEARNEY & TRECKER, Table 14x70".

SLOTTERS & SHAPERS

- 14" NEWTON, 30" Table, A.C. M.D.
- BETTS SLOTTING, 9" Stroke.
- 72" MORTON DRAWCUT SHAPER, 18' travel.
- 24" CINC. SHAPER, Sgle. Pulley Drive.

PLANERS

36' SELLERS Plate Planer, 34 pneumatic holdowns, motor drive with motor and control.

DOUBLE HOUSING

- 60"x60"x18" POND, 2 HEADS ON RAIL, M.D.
- 60"x44"x12" GRAY, 4 HDS., M.D. WITH 20 H.P. MOTOR.
- 44"x36"x12" GRAY, 2 HEADS ON RAIL.
- 36"x32"x12" GORTON DOUBLE HEAD, 37" BET. HOUSINGS.

OPENSIDE

- 44"x38"x15" NEW ALBANY, M.D.
- 42"x40"x13" PATCH.
- 42"x42"x14" PATCH.
- 42"x36"x14" NEW ALBANY.
- 42"x45"x15" LINCOLN.
- 42"x44"x15" BEDFORD.

FLOOR: LATHES

- 50"x18" FITCHBURG, Dble. Back Geared, M.D.
- 36"x17" AMERICAN, Geared Head, Q.C.G.
- 30"x12" LeBLOND, Quick Change Gear, 2½" hole.
- 30"x14" FIFIELD, L.C.G. Back Grd. M.D.
- 16"x 8" PRATT & WHITNEY, Geared Hd.
- 14"x 6" BRADFORD; 14"x 6" L & S.
- 8" SUNDRSTRAND STUB LATHE.
- 30" PIT LATHE, face plate 156"."
- PIT LATHE, 86" swing over ways;
- NEW 14"x6" ROBBINS GEARED HD. TOOL ROOM LATHE, M.D. Taper Att., Motor in base. M.D. NO PRIORITY—IMMEDIATE DELIVERY.

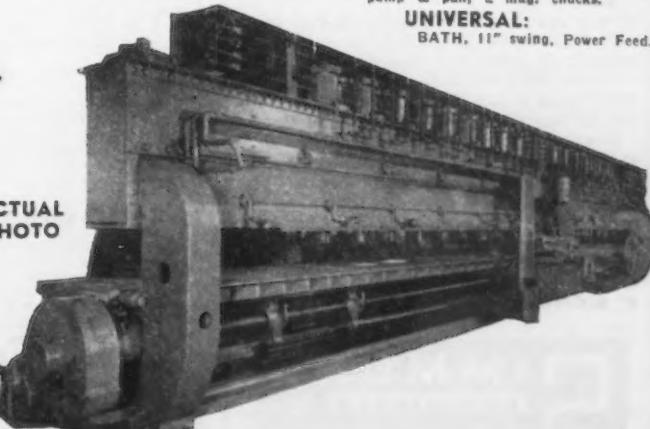
TURRET:

- No. 1-A WARNER & SWASEY, 2½" cap. Power Feed, Rapid Traverse, M.D.
- 28" N.B.P., 4½" hole, Power Feed, M.D.
- 26" LIBBY, Grd. Hd., 7½" hole, P.F., M.D.
- No. 16 GISHOLT SIMPLIMATIC, 21" & 23" swing.
- No. 6 B & S, 2-1/16" hole, Back Geared, M.D.
- JONES & LAMSON GRD. HEAD, A.C. M.D.
- 2½x24", Bar Feed; 2½x24" Chuckers (2).
- 18" LIBBY, Grd. Hd. 3-9/16" hole, M.D.
- No. 3 FOSTER; and WOODS.
- No. 2 BARDONS & OLIVER.

SCREW MACHINES

- No. 2 B & S TURRET FORMERS (2) 1½" hole.
- 2½" GRIDLEY SGLE. SPINDLE AUTO., M.D.
- No. 55 NATIONAL ACME; No. 652 NEW BRITAIN AUTO. CHUCKER.
- Nos. 2 & 3 MANVILLE WOOD SCREW MACHINES.

ACTUAL PHOTO

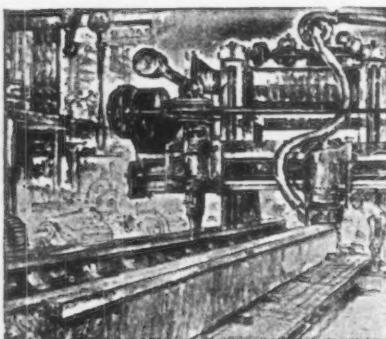


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Machinery Co., Inc.
1435 W. PERSHING RD., CHICAGO 9, ILL.

THE CLEARING HOUSE

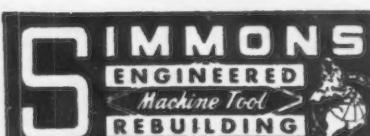
ENGINEERED REBUILDING



By Simmons

Every machine listed in this column is in our warehouse at press time.

42" BULLARD NEW ERA, 11000 serial
42" N.B.P. Car Wheel Borer
66" N.B.P. Vertical Tire Mill
27" BRIDGEFORD Axle Lathe
29" PUTNAM Axle Lathe
42" PUTNAM Car Wheel Lathe
2 1/2" Bar CLEVELAND Horizontal, Table Type Boring Mill
2 1/4" Bar LUCAS Horizontal, Table Type Boring Mill, M.D.
5" Bar DETRICK-HARVEY Floor Type Boring Mill
4' HAMMOND Sensitive Radial Drill
7' AMERICAN Universal Radial Drill
7' CARLTON Motor-on-arm Radial Drill
BLANCHARD No. 16 Surface Grinder
33"x9" G&E Spur Gear Cutter
36"x18" N.B.P. Lathe, G.H., M.D.
No. 2 CLEVELAND Plain Miller
No. 3-B MILWAUKEE Plain Miller
No. 4 BROWN & SHARPE Universal Miller
No. 5-B B&S Plain Miller
No. 6 BECKER Vertical Miller
No. 10 N.B.P. Heavy Vertical Miller
24"x24"x12" INGERSOLL Planer Miller, M.D., 3 heads
24"x36"x12" INGERSOLL Side Head Planer Miller, M.D.
30"x36"x12" INGERSOLL Planer Miller, M.D., 3 heads
30"x30"x10" NEWTON Slab Miller
24"x24"x6" WHITCOMB Planer, one rail head, 230 Volt, D.C.
30"x30"x12" N.B.P. Planer, two heads, 230 Volt, D.C.
36"x36"x12" POWELL Planer, 4-heads, A.C. Motor Drive
48"x48"x20" PATCH Planer, 4-heads, 230 Volt, D.C.
48"x48"x24" N.B.P. Planer, 3-heads, A.C. or D.C. Motor Drive
72"x72"x18" N.B.P. Heavy Planer, 4-heads, 230 Volt, D.C.
60" Throat L & A Shear
RT-40 SCHULTZE - NAUMANN Beam Shear
5" Capacity U.E.F. Alligator Shear
72"-105 Ton L & A Multiple Punch
6"x5" SOUTHWARK Double Angle Shear
12" SELLERS Crank Slotter
20" SELLERS Crank Slotter
2" LANDIS Pipe Threader
6" BIGNALL-KEELER Pipe Threader



SIMMONS MACHINE TOOL CORP.
1721 North Broadway, Albany, N. Y.
N. Y. Office: 50 East 42nd St.

CLOSEOUTS

BORING MILLS

Horizontal

2 1/2" Universal, Cleveland, Binsee
4" Binsee

Vertical

66", 120" Niles
42" Bullard, M.D.
54" Colburn, M.D.

TURRET LATHES

Nos. 2A, 3A W. & S. 4 1/2" hole
24" Gisholt, 6 1/2" hole
Foster Nos. 4, 5, 6, 1B, M.D.
W. & S. No. 4 Univ.
J. & L. 2 1/4x24", 3 1/4x36"
Acme 3 1/4x36" grd. head

GRINDERS

P. & W. 14", 18", B.B. Vert., M.D.
Blanchard 30", M.D.
Modern 12x48", M.D.
Norton Hydraulic 12x18", M.D.
Head Nos. 55, 70, 72A Internal, M.D.
Norton 50"x28", M.D.
Gardner 72" Disc, M.D.
Landis 6x20", Hydraulic, M.D.
Bryant No. 12, M.D.
Nos. 50, 55, 60 Head Int. Hydraulic, M.D.
B. & S. No. 3 Univ.
B. & S. No. II, S.P.D.

LATHES

14"x 6" Sebastian Grd. Head
48"x12" Harrington Std. Bed
McCabe 26-42"x14"
26"x24" Putnam 3 step cone D.B.G.
24"x12" Boye & Emmes 3 step cone, D.B.G.
20"x14" Rahn-Larmon, raised to 24"
16"x 8" Lodge & Shipley Grd. Hd., taper, M.D.
14"x 6" Hendey, taper
9" LeBlond Automatic
36"x20" Putnam S.C.G., D.C. M.D.
LeBlond 36"x21", M.D.
Wickes 32"x26", M.D.
Putnam 36"x30", M.D. ♀

AUTOMATICS

New Britain 1 1/2"x7", 6 spindle, Timken bearings
Cleveland Model A 1/2", 5/8", 1 1/4", 2"
Cleveland Model B 1", 2"
Cleveland 7/8", Model M, 4 spindle
Gridley 4 1/4", single spindle, M.D.
B. & S. Nos. 00, 0G, 2, 2G
P. & J. 6A, M.D.

GEAR CUTTERS

Nos. 3, 12 Barber-Colman Gear Hobber
No. 6 Fellows Gear Shapers
B. & S. Nos. 3-26", 4-36"
Gleason 11" Bevel

MILLING MACHINES

Ingersoll Planer type 36"x36"x12", 4 heads, M.D.
No. 20 Van Norman
10" P. & W. Automatic
No. 2A Milwaukee, S.P.D.
No. 3 Cincinnati, S.P.D. rapid traverse, M.D.
Nos. 1Y, 0Y, 3, 4, 5, 6 B & S Plain & Univ.
B. & S. Nos. 12, 13, 13B
Hall Planetary Model D Thread Miller
Provident Planer Type 32"x8"
Becker Nos. 3, AB, 5, 6 Vert.
Nos. 3, 4, Cincinnati Vert.
P. & W. No. 12 Proffler, M.D.
No. 4 B & S. Universal

RADIALS

4" American Triple Purpose
8" American Triple Purpose, M.D.
5" Dresses Full Universal
3", 3 1/2" Cincinnati-Bickford
4" Mueller, M.D.
4", 5" Western, S.P.D.

MISCELLANEOUS

Gorton #18, 3S, Engraving Machines
6 spindle Avery Drill, 15" overhang
800 ton coining press, McCabe 1/2" Flanger
Rochester No. 5B Hammer
Pels 6" Throat Punch, Pottstown Tappers
P. & W. 6" Vert. Shaper
Marvel Metal Band Saw No. 8, M.D.
Pipe Machines, 6", 8", M.D.
N.B.P. 15" Slotter, M.D.
No. 30 Nates Multiple Spindle Drill
150 ton United Steam Hammer
Thompson-Gibbs Spot Welders 17 KVA
Anderson Taper, No. 3 Quickwork Rotary Shear
6x80" Pratt & Whitney Thread Miller
5/8"x5" Plate Straightening Roll
4x4"x6" Williams & White Angle Bending Roll

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RIVETERS

Chicago Pneumatic, size 10x25x97, 24" throat
Hanna Bench Type, 8" throat
Hanna Pedestal Type, 13" throat
1/4" Shuster, belt
No. 3A High Speed Riveting Hammer, m.d.

SAWS

6x6" Peerless Hack Saw, 6 speed gear box, m.d.
Nos. 3 and 8 Nutter & Barnes Cold Saws
Burt Cold Saw
Nos. 5 and 6 Cochrane-Bly Cold Saws
5" Newton Cold Saw
No. 11 1/2" Higley Cold Saw
No. 138 Eppen-Lucas Cold Saw, m.d.
No. 15 Lea-Simplicity Cold Saw
No. 9A-12x15" Racine Hack Saw, gear box

TURRET LATHES AND SCREW MACHINES

No. 1B Foster Universal Turret, m.d.
No. 2L Gisholt Universal, m.d., Timken Bearings, hardened ways
No. 2A Warner & Swasey Universal, m.d.
No. 3A Warner & Swasey Universal, m.d.
No. 2 Pratt & Whitney Shaver, m.d., cap. 1 1/2"
No. 3 Cincinnati Acme Full Universal, m.d.
No. 3 Foster All Geared Head Universal, m.d., Timken Bearings
1 1/2x18" Pratt & Whitney Turret, cone
2 1/2x24" Jones & Lamson Geared Head Flat Turret, m.d., bar
3 1/4" Cincinnati Acme Geared Head Flat Turret, m.d.
3 1/4x32" Jones & Lamson Geared Head Flat Turret, m.d., bar
3x36" Jones & Lamson Geared Head Flat Turret, m.d., chucking
2 spindle 3x36" Jones & Lamson Flat Turret, m.d., chucking
18" Libby Type A Turret, m.d., chucking
20"x7" American Turret Lathe, cone
20"x30" American Geared Head Turret, m.d.
24" Gisholt Turret, cone
24" Steindle Turret Geared Head, m.d., chucking
26" Libby Type C Turret, m.d., chucking, 7 1/2" hole
In spindle
28" Gisholt, cone
Woods Tilted Turret, model D, cone

ROLLS

No. 3 Ajax Forging Rolls, m.d.
No. 4 Hilles & Jones Straightening Rolls, cap. 1 1/2" plate 6' long, or 1" plate 8' long, m.d.

SHEET METAL MACHINERY

No. 1 Gray Sheet Metal Cutter, 3/16" cap. 34" throat
No. 3 Gray, cap. 5/8", 36" throat
No. 2 Bethlehem Rotary Shear, 32" throat, 1 1/2" cap.
Southwark Rotary Metal Cutter, 36" throat, 3/8" cap.
8"x10" ga. Robinson Power Brake
No. 22 Williams & White Eye Bender, cap. 1 1/2" round stock
McGee Pneumatic Flanger, cap. 5/8" plate
8" Niles-Bement-Pond Hand Flanger, 1/4" cap.
No. 2 Campbell Nibbler, 12" throat, cap. 3/8" Outside Rolling Machine, 20" throat, 18 ga.
Magee Sheet Metal Wiring & Edging Machine, m.d.

SLOTTERS

10" Newton, belt
12" Remont-Miles, var. speed, m.d.
12" Niles, m.d.
17" Canada, m.d.

No. 1 and 3 National Acme Screw Slotters
48" Niles-Bement-Pond Geared Slotter, reversing m.d.

TAPPERS

No. 1 Garrin Knee Type
1/2" Rieker & Shaffer
No. 5 Webster & Perks 5 spindle Nut Tappers

WELDERS

No. 5A Toledo Butt Welder, 220 volts
200 amp. General Electric Arc, d.c. to Pontiac Engine

MISCELLANEOUS

Gisholt Precision Balancing Machine, m.d.
Anderson Filing Machine, m.d.
Abbott Burnishing Barrel, belt
No. 5A Frankfort Gas Furnace
Bettis & Harvey 2 spindle Profiler
No. 12 Pratt & Whitney 2 spindle Profiler
Nos. 11 and 11B Cochran-Bly Saw Sharpeners
Wagner Saw Sharpener, belt
No. 1 Leighton Type Straightening Machine, new
No. 1 1/2A Standard Rotary Swaging Machine, m.d.
No. 12 Morey 2 spindle Profiler, m.d., latest type
No. 2 Cochran-Bly Filing Machine

More than 1,000 machines in stock.
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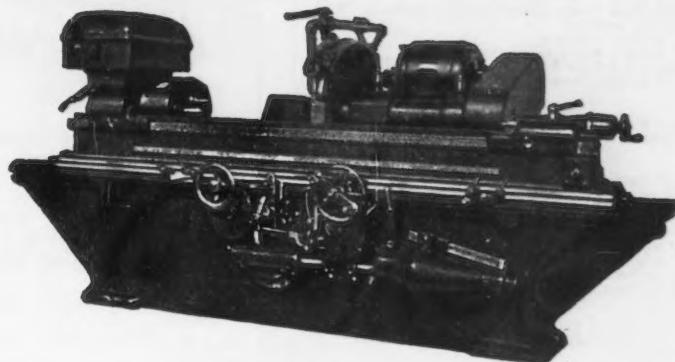
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MOTOR-DRIVEN

GRINDERS

featuring the HILL-CLARKE
MULTIPLE V-BELT WORK HEAD
AND SUPER-GRINDING FOR
MICRO-FINISH

Hill-Clarke Modernized and Motorized Cylindrical Grinders offer refinements in design which minimize vibration and assure extreme accuracy on all grinding operations. One of these refinements, the Hill-Clarke Patented Multiple V-Belt Drive to work spindle, contributes to the smoothness in operation which makes possible a finish within a few micro-inches even when using standard grain free-cutting wheels.

Send for a copy of our catalog "Super Grinding."



SIZES AVAILABLE

10 x 36	14 x 36	16 x 30
10 x 50	14 x 50	16 x 50
10 x 72	14 x 72	16 x 72
10 x 120	14 x 96	18 x 168



Have you any NORTON Grinders you wish modernized and motorized?

HILL-CLARKE MACHINERY CO.
647 WASHINGTON BOULEVARD,
CHICAGO, ILL.

LATHES

84" Niles-Bement-Pond, 28' long,
17' centers, 72" geared face
plate DC drive.

36"x26' Wickes Grd. Hd., M.D.

36"x21' LeBlond Grd. Hd., M.D.

36"x30' Putnam Grd. Hd., M.D.

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One LaPointe CPC-12-30 model, serial 43264, built 1943, 12 ton vertical hydraulic press, 36" max. stroke, speed down—24 ft. per minute, up—46 ft. GE motor, Type KF, 1165 RPM, 15 HP, 220/440 volt, 3 phase, 60 cycle. Excellent condition. Available 10 days.

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10" x 36" Norton
Cylindrical Grinder

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Phila., Pa.

CYLINDRICAL GRINDER

12" x 72" Cincinnati Plain Cylindrical Grinder. No. 11 B&S centers, 24 work speeds, 12 table speeds, 2" x 17" grinding wheel. With 8 steady rests, 8 leveling blocks, center grinding attachment, pump tank and piping, and motor controls. Main drive 20 H.P., 230 V D.C. motor. Headstock motor 1½ H.P., D.C. A-I condition. Immediate delivery.

BORING MILL, 24" Bolland, "New Era," M.D.
BORING MILL, 60" Gisholt, 2 heads, R.P.M.
BORING MILL, Heriz, Barrett, Va. 5" x 20" less
BUFFERS, Gardner 4 H.P., 230 Volts, D.C.
DRILL, 6 spindle Milwaukee Heavy Duty
DRILL, Radial, 6" Cincinnati-Bickford, M.D.
GEAR CUTTER, spur 40" G & E, S.P.D.
GEAR HOBBER, 38-H G & E Automatic, M.D.
GEAR PLANE, bevel 54" Gleason, M.D.
GRINDER, vert. surface Springfield 75" x 15"
GRINDER, vert. surface P & W, 22" x 14"
HAMMER, Upright Hove 500 lb. Bement
HAMMER, steam forging 250 lb. Bement
HAMMERS, steam forging, 1100 lb. N.B.P.
LATHE, 20" x 18" American Geared Head, M.D.
LATHE, 72" x 24" Pond, heavy duty, e.h., m.d.
MILLER, No. 2 Kemansmith Maximiller, tbd. 12" x 50"
MILLER, vert. plain 5 B & S, tbd. 34" x 16", B.D.
MILLER, vert. plain 2½" Milwaukee, M.D.
OUTBOARD SUPPORT, 3½" bar Heriz, M.D.
PLANER, 36" x 50" x 16" Detrick-Harvey, 2 heads
PLANER, 24" x 24" x 16" Powell 1 Head, M.D.
SHAPER, 24" Milwaukee Heavy Duty, M.D.
SLOTTER, portable 48" Morton, M.D.
SLOTTER, 18" Newton, table 36" dir., P.F., B.D.
STRAIGHTENER, tube Terrington, ¾" O.D.
STRAIGHTENER, plate H & J 64" x 2" hot
STRAIGHTENER, Newbold 48" x 16 gauge
STRAIGHTENER, 1 ½ Roll Button ¾" to 1½" bore, ¾" to 2" tubes, M.D.
TURRET LATHE, 34" Gisholt, "K", H.S. 4½"

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United Engineering & Foundry
ALLIGATOR SHEAR

B-1 Steam Driven, Capacity 4" square or 4½" round.
Also smaller shears.

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4" Ajax Upsetting & Forg. Machine
Susp. Slides—M.D.—Rebuilt

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Guided overarm heading slide
Other Upsetters 1" to 7"

Steam Forging Hammers—Single & Double
Frame—250# to 2000#

1000# Erie steam drop hammer

Bradley Hammers, all sizes

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Bulldozers #1, #2, #3 & #8 W. W.

Single End Punches

Bending Roll, cap. 10' 5/16

Bar Shears 2", 3" cap.

Cold Roll Forming Mills

Yoder & Bartlett, cap. 16 ga.

Tensile Testing Machines 100,000# & 200,-
000#

Die Sinkers #3 P. & W., #5 & #6 Becker
P. & W. Vert. Shaper 10"

Wire Straighteners ½", ¾", ¾"

Clark Gasoline Lifting Platform Truck

Lakewood 6' Electric Tiering Truck

Consolidated #216 Cam Double Action
Cupping Press—100-ton
Bolt, Nut & Rivet Machines

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FRICITION SAW

Complete with circulating pump, water tank,
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up to 8" I-beams. In excellent condition, ready
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GOOD MACHINE TOOLS

AUTOMATICS

1" Cleveland Model J double end, threading, drilling and pointing
1½" Gridley 4 spindle
4½" Gridley H chuck
7" Baird 6 spindle chuck
No. 16 Gisholt Simplimatic

BORING MACHINES

3" bar No. SA Universal horizontal
42" Gisholt vertical

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No. 2L Lapointe hydraulic
No. 3 double Lapointe screw
No. 2 Standard screw press

COMPRESSORS

92" Ingersoll-Rand ERI
42" Chicago, tandem steam
550" National, electric drive
1400" Sullivan, electric drive

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21" Cincinnati Mfg.
25" Weigel
30" Barnes
20", No. 2 Celbura Heavy
24", No. 314 Baker Heavy
35" American radial
4" Western Radial, Timken
Nos. 11 & 12 Nato, multiple
24", No. 10 HO Baker hydraulic

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10", No. 1 Lees-Bradner hobs
Type ZI Fellows gear shaper
24"x12" Flather auto. spur
20"x 8" Brown & Sharpe auto. spur
34"x 6" Gould & Eberhardt auto. spur
48"x10" Brown & Sharpe auto. spur
15" Gleason spiral bevel pinion roughers
15" Gleason spiral bevel gear roughers
18" Gleason bevel testers & lappers
Line 2 spindle chamferer
Angle tooth rounder
Model B National gear cutter checker

GRINDERS

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6"x20", No. 10 Brown & Sharpe
No. 13 Brown & Sharpe univ. T. & C.
12"x36" Bath universal
No. 72 Heald electric indicator automatic internal
18", No. 4 Gorton double disc
20" Gardner semi-automatic disc
6"x24" LaSalle No. 3 surface
6"x18" Monarch surface
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14"x 3" Hendey
16"x 8" Lodge & Shipley
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3½"x36" Lo-Swing
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Milling crankshaft lathe

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No. 2 Pratt & Whitney
No. 3 Foster
21" Gisholt, 3½" hole
22" Libby, 4½" hole
28" Libby, 7½" hole
28" Libby, 1½" hole
29", No. 3B Foster, 5½" hole
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No. 2 Harry Brown & Sharpe plain
No. 2 Van Norman duplex
Type C Hall Planetary thread miller
Types 10 & 25 Productomatic
No. 1 Davis & Thompson duplex
No. 3 Turnmills
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36" Newton continuous rotary

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24"x24"x 5" Gray
24"x24"x 6" Woodward & Powell
36"x36"x18" Cleveland open-side

PRESSES

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No. 53 Toledo S.S.
28" No. 71 Swaine dbl. crank
45" No. 174 Consolidated dbl. crank
No. 33 Consolidated arch.
No. P Ferracote solid knee
No. 2 Standard screw press

MISCELLANEOUS

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Nos. 1-12" and 1-18" Cincinnati Plain Automatic Millers 1941

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GRINDERS

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No. 72-A-3 Head Sizematic 1940

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10"x72" Norton "C" Hydraulic 1941

No. 35 Gallmeyer & Livingston Hyd. Surf. 1941

LATHES—TURRET LATHES

No. 6 R. Cincinnati Acme 1941

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MISCELLANEOUS

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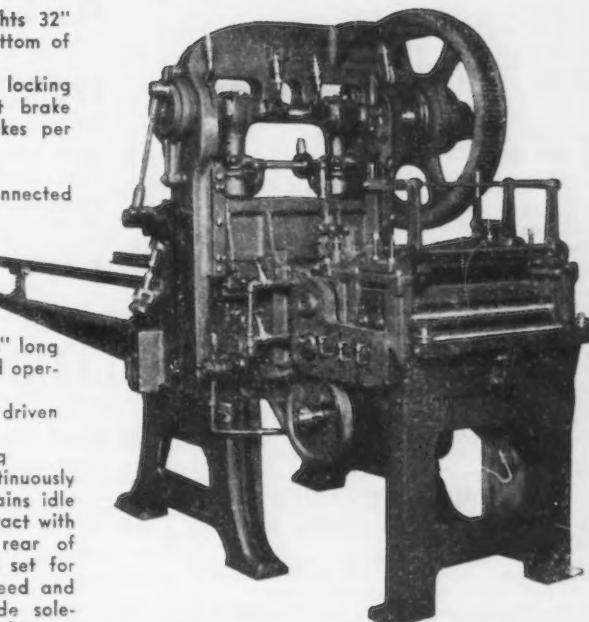
Distance between uprights 32"
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Rolling key clutch with locking pawl and intermittent brake Speed approx. 175 strokes per min.

Solenoid trip for clutch Arranged for direct connected motor drive and equipped with a 3-60-220-1160 motor and starter

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1	1300	G. E.	MPC	550	450
1	1200	Whse.	Int.	550	600/720
1	800	G. E.	MPC	600	600
4	625	G. E.	MPC	500	130
1	600	G. E.	4MPC	600	650/900
1	600	G. E.	MPC	250	200
1	500	Whse.	Int.	250	240/720
1	500	G. E.	MPC	230	900
1	350	G. E.	MPC	230	450
1	350	G. E.	MPC	230	750/1000
1	300	G. E.	MPC	230	375/550
1	250	Al. Ch.	Int.	230	525
1	250	G. E.	C	230	350
2	200	Whse.	Int.	230	400
1	175	Whse.	SK	250	150/525
1	150	G. E.	RC-19A	230	800/1000
1	150	G. E.	MPC	230	250/450
1	130	Whse.	SK-185	115	425/1340
2	130	Cr. Wh.	CMC-65H	550	1200
2	125	G. E.	CO-1832	230	625
1	100	Whse.	SK-200	550	600
1	50/100	G. E.	MPC	230	225/450
1	100	G. E.	LC-50	230	1200
1	100	Whse.	SK-180	230	600
1	100	G. E.	RC-38	230	600
1	75	Sprague	C	230	500/1000
1	75	Whse.	SK-183	230	560/780
1	60	Al. Ch.	E-131	115	1750
1	60	El. Dy.	25S	230	525/1050
1	60	Diehl	K-11	230	500/1000
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(1) 3	Shaw	30' 0"	230-VDC.	FL OP.
(1) 3	Shepard	30' 11"	220-VAC.	FL OP.
(1) 4	Shepard	30' 0"	230-VDC.	FL OP.
(1) 5	Niles	24' 0"	220-VAC.	FL OP.
(1) 5	Box	40' 0"	A.C. or D.C.	CG. OP.
(1) 5	P. & H.	40' 0"	A.C. or D.C.	CG. OP.
(1) 5	Shaw	45' 7"	440-VAC.	CG. OP.
(1) 5	Northern	47' 3"	440-VAC.	CG. OP.
(1) 10	Whiting	80' 0"	440-VAC.	CG. OP.
(1) 15	Morgan	52' 3"	230-VDC.	CG. OP.
(1) 20/5	Northern	60' 0"	220-VAC.	CG. OP.

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(2)—1½-yd. 230-VDC. & (1)—¾-yd. 220-VAC.
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Tons	Make	Current	Motors	Remarks
(2) 1	Shepard	230-VDC.	One	Var. Sp.
(2) 1	Euclid	115-VDC.	One	Single Sp.
(1) 1	Cleveland	230-VDC.	Two	FL or CG. OP.
(2) 2	Shepard	230-VDC.	One	Single Sp.
(2) 2	Shepard	230-VDC.	Two	Var. Sp.
(1) 3	Shepard	220-VAC.	Two	FL OP.
(1) 4	Shepard	230-VDC.	Two	FL or CG. OP.

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(3)—3	Shaw	Class C.E.	750
(2)—5	Westinghouse	H.K.-#2	850
(1)—6	G. E.	C.O.-1805	1150
(5)—7½	G. E.	C.O.-1805	750
(1)—8	Westinghouse	MCB-20	725
(1)—7/9	C. W.	Size-A.W.	740/580
(1)—7/10	G. E.	M.D.-102-B.R.	1025/800
(6)—14/19	C. W.	Size B.W. (Back Axle)	875/560
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(10)—27	Westinghouse	M.C.-40	490
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HELP WANTED—Salesman for Metropolitan New York to represent a mill manufacturing tool steel and stainless. State age and qualifications. Statement of availability required. Address Box Z-81, care The Iron Age, 100 E. 42nd St., New York 17.

WANTED—PRODUCTION MANAGER for medium size drop forging plant, east of Pittsburgh. Give full particulars, experience, salary expected, references. Address Box Z-54, care The Iron Age, 100 E. 42nd St., New York 17.

HELP WANTED

WANTED: Plant Manager and Development Engineer for factory now employing 90 workers manufacturing wire goods and light strip steel products. Permanent position with real postwar opportunity for experienced man, thoroughly capable of taking complete charge of plant operation and having full knowledge of production, tooling and streamlining plant operation. Must have creative and designing ability for continuous improvement and development of products. Plant located in Southwest. Give full details personal history, qualifications, past experience, availability, salary requirements. References held confidential if requested. Address Box Z-33, care The Iron Age, 100 E. 42nd St., New York 17.

WANTED — ASSISTANT SUPERINTENDENT for Gray Iron Foundry. Must have full knowledge of pattern making, coremaking and molding, and possess ability to handle a large plant specializing in the manufacture of high quality, intricate medium and heavy castings for the Diesel Engine, Machine Tool and Machinery trade. We offer a fine present and postwar opportunity for the right man. Statement of availability required. Address Box Z-82, care The Iron Age, 100 E. 42nd St., New York 17.

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Superintendent
For Manufacturer
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To supervise large modern toolroom; should have mechanical engineering background and a minimum of ten years diversified practical experience in the manufacture of small precision dies and tools. Work will include planning and personnel administration. Applicant must have had contact with various phases of mass production manufacture of metal articles.

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Ohio Manufacturer with Die-Cast Division needs Tool or Die Designers to design Die-Cast Dies, Tools, Jigs, and Fixtures. Broad experience with Machine Tools essential. Some Mechanical and Hydraulic Engineering experience advantageous. Living conditions good in small town, or near-by medium sized city. Excellent post-war opportunities. W. M. C. Rules apply.

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ADDRESS BOX B-986

Care The Iron Age, 100 E. 42nd St., New York 17

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To take charge of small shop building construction equipment for over 25 years. Must be practical man with full knowledge of machine shop and steel fabrication. Capable of handling men and producing results. Position is permanent. Presently employ about 30 men. Location: New Jersey. State age, education, experience and salary expected. Statement of availability required.

ADDRESS BOX Z-21

Care The Iron Age, 100 E. 42nd St., New York 17

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Young graduate industrial engineers to fill positions as time study engineers with old, firmly established manufacturer of brass mill and fabricated products. Permanent employment with excellent postwar possibilities for right men. Advise training, experience and salary required.

Statement of availability required.

ADDRESS BOX Z-55

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Experienced in development, design and application of Valves, Fittings and Accessories for Pressure Vessels used by the Power and Petroleum Industries.

Wanted by old established Detroit Company—with no Post War Conversion Problems.

Give complete details of personal qualifications, age, draft status, work history, present earnings and salary expected in letter of application.

Employment in accordance with W.M.C. regulations.

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Give full details of personal qualifications and work history and salary expected. Statement of availability required.

ADDRESS BOX Z-50

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WANTED—an experienced and able designer of heavy machinery. Applicant should have sound grounding in mathematics, preferably a graduate mechanical engineer, and should have had several years' experience in machine design. Position is with growing business in an essential industry with opportunity for advancement. Give full background of education and experience, with previous and present employers, which will be held confidential. Statement of availability required. Address Box Z-88, care The Iron Age, 100 E. 42nd St., New York 17.

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PURCHASING ENGINEER or Assistant Purchasing Engineer, industrial field; college training and 12 years' purchasing experience. Will locate anywhere, West Coast preferred. Can furnish statement of availability. Desires change solely for advantage of post-war connection. Address Box Z-87, care The Iron Age, 100 E. 42nd St., New York 17.

ELECTRIC FURNACE MELTER FOREMAN—Experienced in melting of low alloy and stainless steels, basic practice. Well acquainted with slag and steel quality control in both open hearth and electric furnaces. B. S. degree in Metallurgy, married, age 28. Steel foundry or ingot shop preferred. Available immediately. Address Box Z-75, care The Iron Age, 100 E. 42nd St., New York 17.

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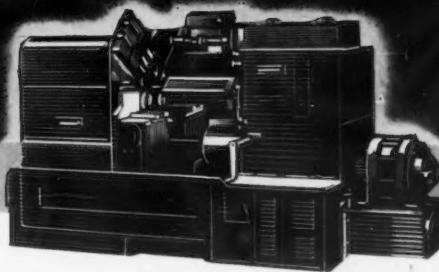
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.. That a Man may Speak his Mind
. That a Woman may drive to Market



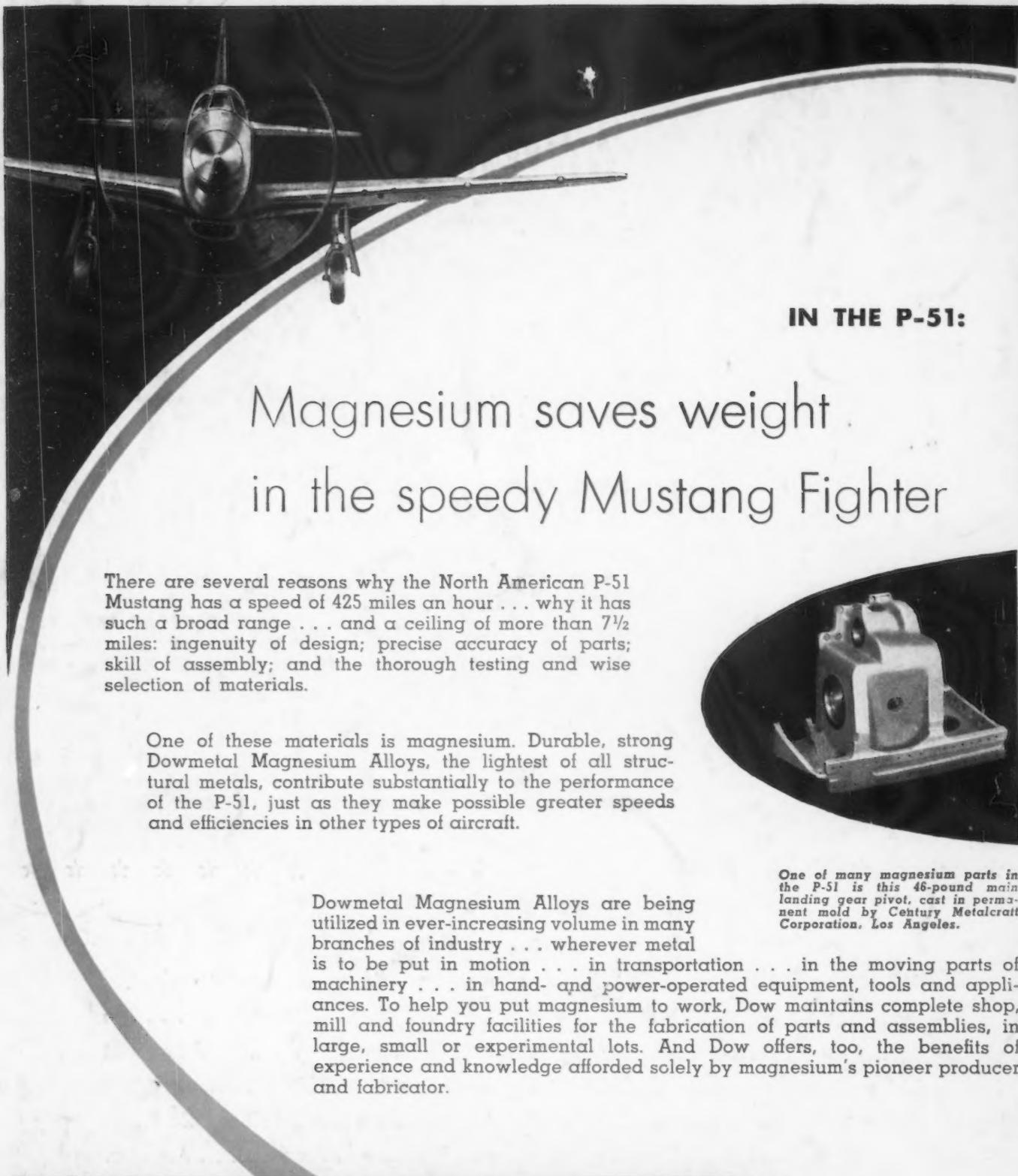
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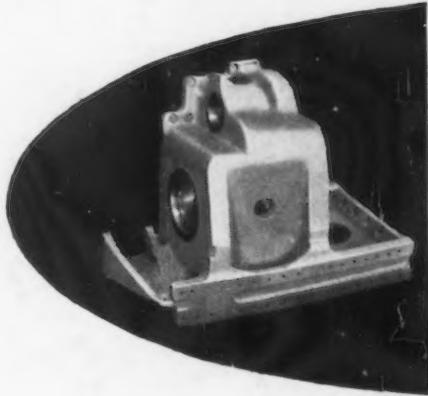


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